

THE MOTOR AGE

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THE ASSOCIATED AMERICAN MOTOCYCLISTS

Boston, Aug. 27.—Following a preliminary meeting held in this city on August 2, a second one was held at the Hotel Thorndike on Wednesday, August 22, at which a permanent organization of motocyclists was effected under the name of the Associated American Motocyclists. Fifteen persons were present, and letters were read from almost as many more pledging support.

The following officers were elected: President, C. H. Motz, Waltham, Mass.; vice-president, Kenneth A. Skinner, Bos-

ton; secretary, S. W. Merrihew, New York; treasurer, E. C. Stearns, Syracuse, N. Y.

These officers, with five members-at-large, constitute the executive committee, the five being: Edward Hayes, Providence; A. L. Adams, Wilsonville, Conn.; Frank I. Clark, Baltimore; A. L. Banker, Pittsburg; Geo. K. Barrett, Chicago.

A constitution was adopted; a committee was appointed to arrange a run to Newport, R. I., on September 15 in celebration of the organization; a committee

was appointed to select an emblem, and a resolution was adopted pledging the organization to use its efforts to cause an observance of all rules and regulations relating to motorcycles.

It has been developed that the interest taken in the organization is surprisingly large, and the outlook for a considerable membership is very good.

The constitution reads as follows:

Article 1. This organization shall be known as the Associated American Motorcyclists.

Article 2. Its objects shall be to promote the general interests of motorcyclists; to defend and protect them in their rights upon public highways and conveyances; to foster a fraternal spirit between them; and to promote such events as may be considered within its scope.

Article 3. Any reputable motorcyclist shall be eligible to membership in this organization upon payment of one dollar initiation fee and an annual membership fee of one dollar, and shall become a member if his application shall be endorsed by one member or two other reputable citizens and approved by the executive committee or the sub-committee thereof.

Article 4. The officers of this organization shall be, at present, a president, a vice-president, a secretary and a treasurer, who, with five members elected from the general membership, and each of whom shall represent a different state, shall comprise the executive committee, of which five shall constitute a quorum, which shall devise, direct and decide all matters not covered by this constitution.

Article 5. The annual meeting of this organization shall be held on the third Saturday in June, at such place as in the judgment of the executive committee shall be deemed most suitable.

Article 6. This constitution may be altered or amended by a two-thirds vote of the membership present at any annual meeting.

SCHWARTZKOFF RESIGNS

New York, Aug. 28.—E. E. Schwartzkoff has resigned the editorship of the Automobile Magazine, which lately went into

the hands of a receiver, owing, it is said, to the financial embarrassment of the owners of the publication from other causes, although the magazine, itself, has never been a paying property. The publication is now for sale.

INTEREST IN CHICAGO TOURNAMENT

Interest in the Inter Ocean tournament of September 18 to 22, at Washington Park Track, Chicago, is growing rapidly. The publication of the extensive list of exhibitors has had the effect of arousing other manufacturers and several more have contracted for space, more than insuring the success of the most elaborate affair of its kind that has ever been promoted in this or any other country.

MAY RACE AT NEWPORT

New York, Aug. 27.—A Newport dispatch says: "The sporting set, especially that faction who are interested in horseless carriages, are all of a flutter over the announcement today that Newport after all will have a series of automobile races this season, for the prizes offered by William K. Vanderbilt, Jr. It will be recalled that last Friday the police commissioners expressed themselves as being unable to grant the request of automobilists for permission to speed their machines on the Ocean Drive, and that cottagers were very much cast down in consequence.

"Those most interested, however, did not cease their labors, and today it was announced that the events for Mr. Vanderbilt's prizes would take place at Aquidneck Park, which was formerly a race track, on September 6.

"But that is only half the reason of the flutter among those who love excitement. It is believed that there is a possibility at least, and some believe a probability of a race between Mr. Vanderbilt's swift French automobile and the one just brought over by Albert C. Bostwick. Mr. Vanderbilt is not saying anything about a go, but it is believed that if Mr. Bostwick should be there on September 6 there may be such an event on the card.

"At any rate, Mr. Vanderbilt has of-

ferred some pretty prizes, and if the two big machines are not seen there will be plenty of sport with the smaller ones."

Mr. Bostwick was interviewed by a Motor Age man today as to his intentions in the matter.

"I do not expect to take part in these races," said he. "In the first place, the fittings of my De Knyff Panhard will not be ready in time. In the second place, I would not race my heavy car on a half-mile track if it were all ready. My car is built for long tests and for the exigencies of road speeding and not for a racing machine around a small track, whereon a high geared, light steam wagon could easily beat Mr. Vanderbilt in his heavy German Daimler or myself in my cumbersome Panhard. As to racing on my tricycle, that cannot be, for it has not reached this country yet."

Mr. Bostwick, however, regards seriously the races to be run at Trenton and on the mile track at Guttenburg in September.

AN AUTOMOBILE ACCIDENT COMPANY

New York, Aug. 27.—The organization of an automobile accident insurance company or association on practical but novel lines is in contemplation in this city. Its object will be to insure its members or policy holders against accidents, such as runaway horses, etc. The company or association will defend all such suits, which automobilers claim have become numerous on slight provocation throughout the country.

TOURING THE YOSEMITE

Oliver Lippincott and E. Russell, on a Locomobile, were the first chaffeurs to penetrate the Yosemite. In it they climbed up 2,500 feet to Glacier Point, which is about 9,000 feet above sea level.

COUNTY FAIR ATTRACTIONS

New York, Aug. 27.—Automobile exhibitions and speed contests are to be made the chief features at the county fairs all over the country this autumn. The demand for entries for the races is far beyond the supply. Already chaffeurs with

sporting blood are arranging for tours of the country, taking in the races and paying their expenses from the prizes. For instance, L. R. Clinton and R. M. Whipple have had no difficulty in securing engagements for their Locomobiles for these races and will make a tour of the circuit. Whipple has just completed a tour of 1,200 miles through New York state and writes the Locomobile Co. of America of his complete satisfaction with the performance of his vehicle.

A PECULIAR ACCIDENT

Columbus, Ohio, Aug. 27.—Dr. Clovis Taylor and wife, of this city, had a thrilling experience last week with their automobile. They had been out into the country for a little visit with some of their friends and were returning down a steep hill when their auto was going at the rate of about forty miles an hour. At the foot of the hill they struck a culvert with terrific force, throwing both occupants into the air. Neither the doctor nor his wife were hurt seriously, but their automobile was badly smashed and had to be carted home on a dray. Auto drivers will, perhaps, learn after a while that it is necessary to use a little discretion in the handling of their vehicles.

NELSON'S HARD TASKS

New York, Aug. 27.—Harry Elkes, so says a cable received here today, will arrive on the Kaiser Wilhelm der Grosse and Arthur Ross is now on the ocean homeward bound on La Touraine. John Nelson will have his hands full even if he beats Jimmy Michael at Woodside Park, Philadelphia, next Saturday.

RIOTERS WRECK PATROL WAGON

Akron, Ohio, August 27.—The rioters who destroyed several hundred thousand dollars' worth of city property last week in an effort to lynch a negro ravisher, had a picnic with the famous automobile patrol wagon which has been in use in this city for some months and which has the first of its kind in the country. They ran it up and down the streets with none

too experienced care and after battering the machine almost to pieces, they wound up by running it into the canal. It will probably have to be rebuilt. City Electrician Loomis, who built the wagon, and who is at the head of the recently organized company which proposes to build similar vehicles, is one of the several city officials who were injured in an ineffectual attempt to maintain order. A number of rubber workers from the tire factories here took part in the riot and several were reported injured.

INTEREST IN EXHIBITIONS AND RACES

Jersey City, Aug. 27.—Demands far in excess of the space for the automobile exhibition and races in connection with the Tri-State Fair at Guttenburg, September 18 to 22, have been made. The automobile exhibition hall has 40,000 square feet of space and the leading motor-vehicle makers will be represented.

The motor-vehicle and motorcycle races will be run on Tuesday, the first day of the fair. The program of them is now in the printer's hands, but The Motor Age representative secured a synopsis of the events as follows:

Event No. 1—Parade. Prizes for appearance and decoration.

Event No. 2—Motor tandems, distance five miles. Prizes, \$100, \$50, \$25.

Event No. 3—Motor tricycles, distance five miles. No pedaling after the start. Prizes, \$100, \$50, \$25, or equivalent values in plate.

Event No. 4—Electric vehicles, to carry two people, distance ten miles. Prizes, \$100, \$50, \$25, or equivalent value in plate.

Event No. 5—Gasolene vehicles, to carry two people, weight 1,000 pounds or more. Prizes, \$100, \$50, \$25, or equivalent value in plate. Distance, ten miles.

Event No. 6—Gasolene vehicles, to carry two people, weight less than 1,000 pounds. Distance, ten miles. Prizes, \$100, \$50, \$25, or equivalent value in plate.

Event No. 7—Steam vehicles, to carry two people. Distance, ten miles. Prizes, \$100, \$50, \$25, or equivalent value in plate.

Event No. 8—Ten-mile championship, for winners of events No. 4, 5, 6 and 7. First prize, plate value, \$100.

Event No. 9—Brake and manipulation prize, \$50 gold medal.

Event No. 10—Obstacle race. To test manipulation by steering in and around obstacles. Prize, \$50 gold medal.

The entrance fee to the above events is five dollars. Entries and applications for space in exhibition hall may be made to P. T. Powers, manager Tri-State Fair Association, Montgomery and Grove Streets, Jersey City.

The mile track is seventy feet wide and has stretches a third of a mile in length.

THEATRICAL ADVERTISING

New York, Aug. 27.—Automobile advertising is spreading in the theatrical business. The Motor Age some weeks ago told how Hi Henry used his motor-vehicle to advertise his show, and now Lafayette, the juggler, has a Locomobile, on which he has put \$1,600 worth of silver filigree decoration. A ride through a town's street the morning of the show does the business.

DISTANCE TRIAL TO BE POSTPONED

New York, Aug. 27.—It is hinted to your correspondent by one who ought to know that there is very little chance of the 600-mile endurance test, which was to have been promoted by the Automobile Club of America, in October or November, being run off before next spring.

LOCOMOBILE SURRIES IN DEMAND

New York, Aug. 27.—Canopied surreys are now being turned out so rapidly by the Locomobile Co. of America in response to a vigorous demand that orders can now be filled in ten or fifteen days.

NEW YORK POST OFFICE TRIALS

New York, Aug. 27.—The New York postoffice has now in operation a light gasolene mail wagon, made by the Oakman company, of Greenfield, Mass.

TROUBLES OF THE CONSTRUCTOR

Smisor Bros. of Webster City, Iowa, have been experimenting for a considerable length of time on motor-vehicles. Some of the trials that beset the constructor, of which they write to *The Motor Age*, can be gleaned from their experiences.

They began their experiments in the latter part of 1896. Their first work was on storage batteries. After spending considerable time and labor on batteries, without meeting with any great measure of success, they turned their attention to hydrocarbon motors.

After considerable study they constructed a motor of the two-cycle type, and, after experiencing considerable trouble in running it, they abandoned it, for the time being. Later they found that all their difficulties were due to their not having a sufficiently large transfer pipe from the crank chamber to the cylinder of the motor.

In the mean time, they purchased a small motor and built a gear from angle iron, using Sarven wheels. They placed the motor on the running gear and very soon thereafter learned that they needed more power than was furnished by the engine, which was of three-inch bore. They returned the motor to the makers to exchange it for a six-horsepower, two-cylinder motor, having the cylinders side by side. The manufacturers said that

they could supply such a motor, and, later, wrote that it was being constructed. When the motor finally arrived, after a delay of six weeks, it was found that it was, in reality, nothing more than two single-cylinder motors, connected with sprocket wheels and a chain.

One of these two motors was returned to the manufacturers on account of having a defective head. After considerable correspondence, the makers agreed to fix the motor and return it. After two months' waiting, Smisor brothers found that the motor had never been taken from the freight depot, and they had it returned. They then placed the

matter in the hands of an attorney, where it now reposes.

Still undiscouraged, they decided to make use of a single-cylinder motor of sufficient dimensions to drive their vehicle. They purchased one of $4\frac{1}{2}$ -inch bore, with the belief that their experiments were over. They had had years of experience with gasoline engines, but they found that they still had much to learn. They found it necessary to add much to the engine before it could be made to run satisfactorily. It was not, in fact, complete. After no less than six months of tinkering and experimenting, they found themselves possessed of a very satisfactory carriage, that would travel at a high rate of speed and climb

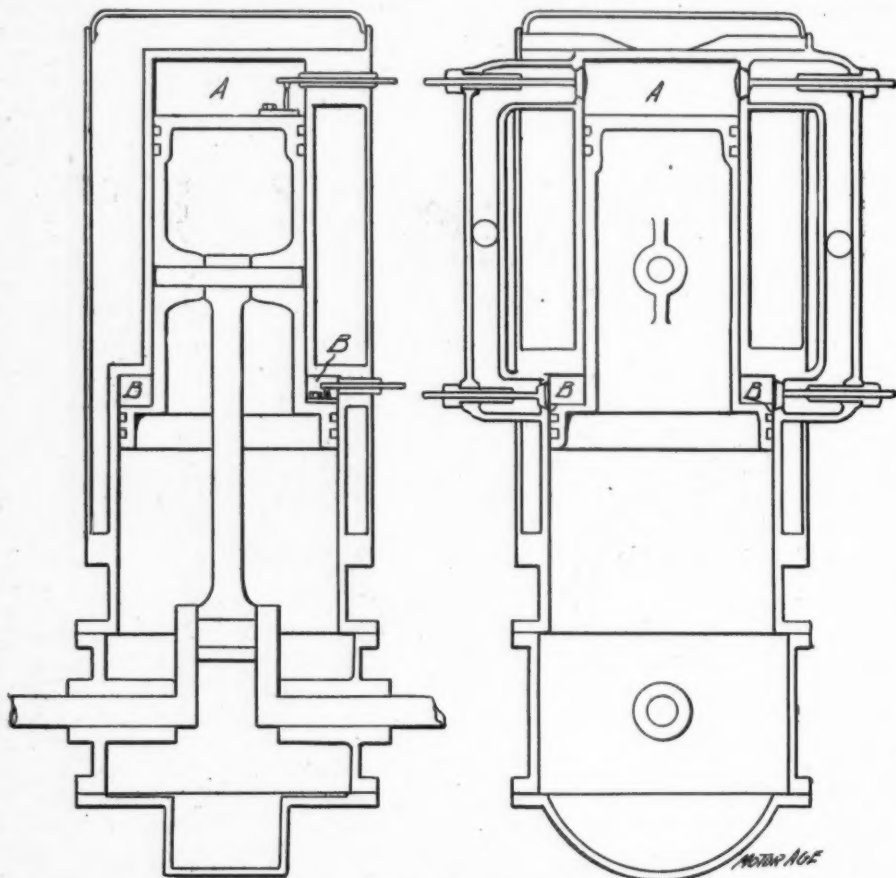


Smisor Bros.' Design.

all ordinary grades. The first illustration shows the appearance of this carriage.

But all this work and experimenting was only preliminary to the work of building motors of their own. They have secured patents for, and are now working on a motor having two explosion

two sectional views of this two-in-one motor. The first explosion chamber is constructed in the usual manner and is shown at A. The second is annular in form and is shown at B. The inventors believe that they will be able to construct a motor of nearly double the power for a given weight, having all the ad-



SMISOR BROS.' TWO-CYLINDERS-IN-ONE MOTOR.

chambers in one cylinder—or two cylinders in one, as they prefer to speak of it. The principle of the engine is illustrated in the second illustration which shows

vantages of a motor with two cylinders, side by side, and without nearly as many complications as are necessary with a two-cylinder engine.



A PUNCTURE IN THE COUNTRY.

ORIGINAL SPEED CHANGING MECHANISM

Though not as yet produced for use on motor vehicles driven by internal combustion motors, the speed changing gear shown in the accompanying illustrations is applicable to the purpose and possesses a novelty in construction which renders it practically interesting from a motor-vehicle as well as from a strictly mechanical standpoint.

This variable speed mechanism is now made for such purposes as driving factory and other machinery which requires not only several speeds but the possibility of an unintermittent change of speed between certain fixed extreme high and low speeds. The fact that it furnishes positive control of speed between limits and does not necessitate reduction or increase by stated jumps and the further fact that it is simple and light are bases for the conclusion that it might be successfully incorporated in the driving gear of those automobiles the character of whose motive power requires that the power be regulated in transmission and not in production.

The device is shown in Fig 1 as a counter shaft arranged for application in shop power transmission. Fig. 2 is a sectional view showing the most important features of the mechanism.

The main driving and driven members are pieces A and B, corresponding but oppositely arranged disks of taurus form. The opposing inside faces are machined smoothly to the shape shown in the illustrations, the center line of the annular curved depression passing through points C and D. Disk

A is keyed to the shaft, but disk B is secured to a sleeve which revolves independently of the shaft and is adapted to slide upon it.

In frictional engagement with A and B are the disks E and F, mounted between bearings G G and H H, respectively, the latter being carried by yokes which are swiveled in the frame. Their swivel centers coincide with points C and D, respectively. The yokes are connected by segmental gears K and L and

the yoke supporting disk E has also a segmental gear M, which, by the pinion N and a handle, effects the operation of the mechanism.

By turning the segmental gear M the disks E and F may be made to occupy various angular positions, the action being obvious. Thus any speed between the assigned limits may be transmitted from the

driving disk A to the disk B. The directions of motion of the two are opposite. In the position of E and F shown in Fig. 2 the speeds of A and B will be the same, but the inclination of E and F in one direction will increase the speed of B, while their inclination in the opposite direction will cause a corresponding decrease.

In Fig. 1 is shown a toggle joint connection between the shaft and sleeve, by means of which the disks A and B can be made to approach each other and squeeze E and F between them or to separate and bring the disks out of engagement. The toggle and its actuating lever thus furnishes starting and stopping means.

A pulley or other driving connection for transmitting the motion to the ma-

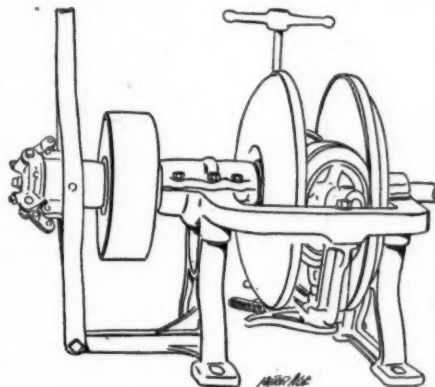


Fig. 1.—Variable Speed Device.

chine or vehicle to be driven may be attached to the sleeve as at O in Fig. 2.

The device is manufactured by the Consolidated Machine Specialty Co. of Boston and is being marketed by the Niles Tool Works Co. of Hamilton, O.

The efficiency of friction drive constitutes an open question, but the experience of those automobile makers who have adopted friction transmission devices of various patterns has shown that

motor is such that the reversal can be readily effectuated by the motor itself.

On account of its simplicity, compactness and comparative cheapness of construction this form of mechanism is desirable. If it can be constructed to furnish reverse as well as forward drive it will fulfill admirably the requirements in connection with application to motor-vehicles. But the method of adding the reversing feature to the device is not as

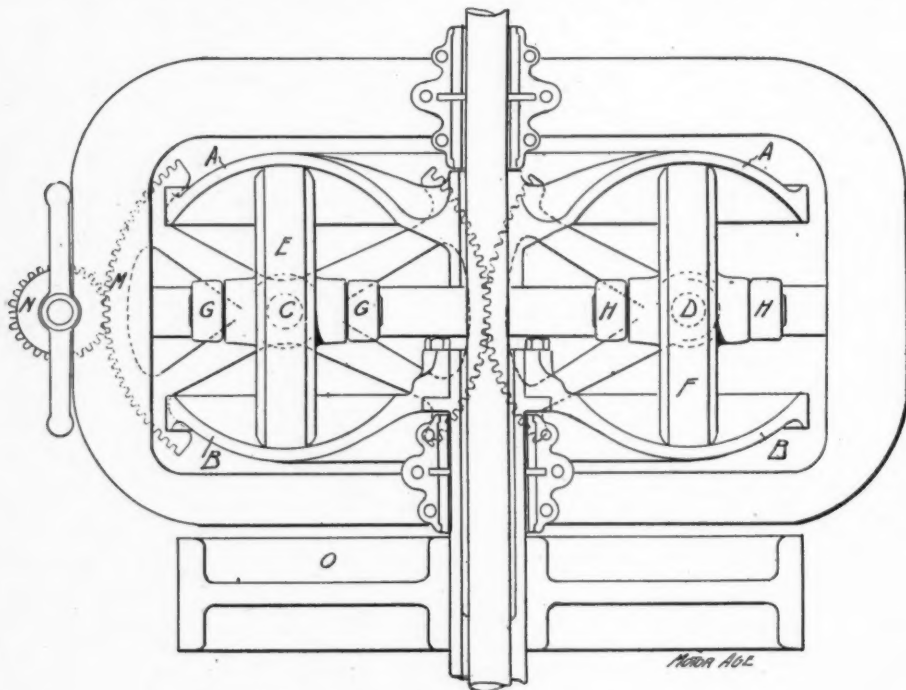


FIG. 2.—VARIABLE SPEED DEVICE.

such transmission is feasible and practical. It is obvious that in friction drive only can a gradual and non-intermittent change from one speed to another be effected.

The device here described accomplishes two of the three results which a successful speed change gear for an internal combustion motor should furnish. It allows positive control of speed and it permits the driving and driven members to be entirely disconnected. It does not, however, furnish means for reversing the direction of the drive, and a backward drive is necessary in automobile power transmission unless the character of the

readily apparent as its desirability.

A separate and distinct reversing gear might be used in connection but such a course would complicate the whole contrivance and tend to make inconvenient the disposition of the gear upon the vehicle frame. Furthermore, it should be possible to reverse the drive through the medium of either the speed changing handle or the lever used for throwing the mechanism entirely in and out of gear, in order to avoid unnecessary addition of levers and handles to be manipulated by the driver of the vehicle. The problem is a good one upon which to work. It is interesting, if not easy.

A PEEP INTO THE FUTURE



THE STATUE OF A DISTINGUISHED GENERAL.

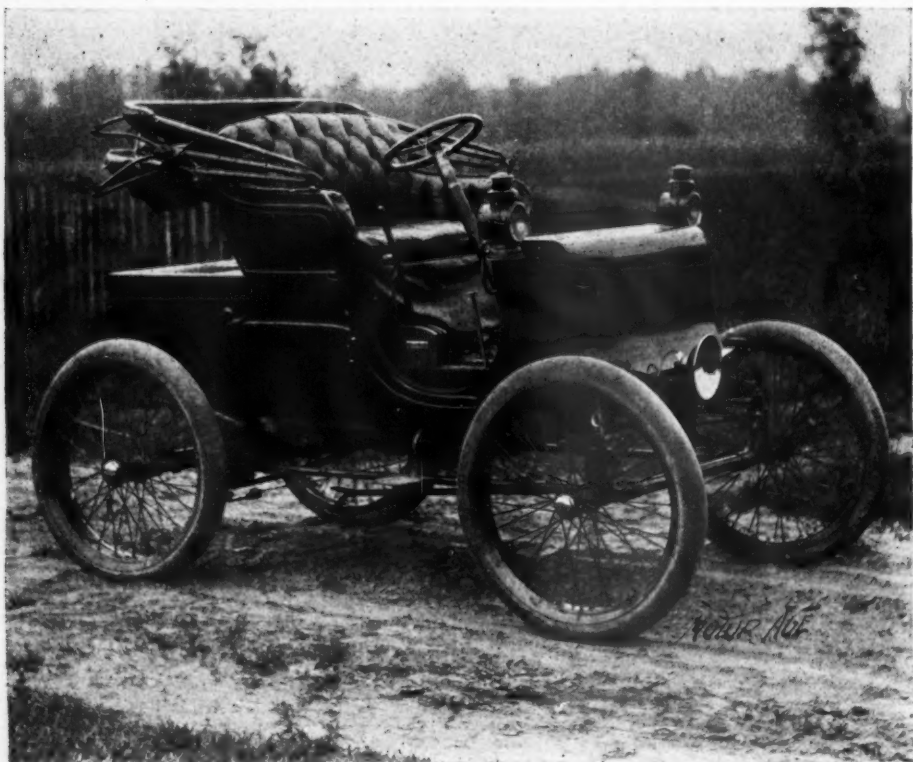
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THE LATEST PACKARD CARRIAGE

DESCRIPTION OF A VEHICLE WHICH EMBODIES A NUMBER OF NOVEL FEATURES—ADOPTED TO HIGH SPEEDS OVER ALL SORTS OF ROADS

The accompanying illustration shows the latest model produced by the automobile department of the New York &

olutions per minute. There are four forward speeds, varying from six miles an hour to thirty or more, and two speeds



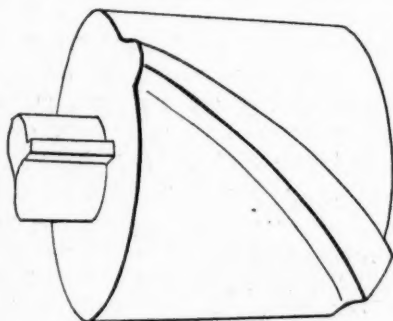
PACKARD HIGH-POWERED CARRIAGE.

Ohio Co., of Warren, Ohio. The appearance and general design of this model are much the same as those of the company's standard Packard carriage, which has already become favorably known. The special machine illustrated is, however, more powerful and adapted for higher speeds. As in the standard carriage, a single-cylinder engine is used, but in the latest design, this engine will indicate twelve horsepower on the brake, at its maximum normal speed of 800 rev-

backward. As in the standard carriage, there are no idle gears in operation while the carriage is running on the higher speeds.

The speed of the carriage is regulated to a nicety by throttling the engine by means of a foot lever. In conjunction with this throttling of the engine, the high tension sparking device is controlled in a unique manner and one which recommends itself to the mechanical mind. The usual two-to-one reduction shaft is

provided with a feather on which is slidably mounted the cam. The cam face is spirally cut, with the face much broader at one end of the spiral than at the other, as shown in the illustration. The same shaft also carries a centrifugal governor, which actuates the slidable cam. When the engine is running at its highest speed, the broad portion of the cam face is in operation, but, as the speed of the engine is reduced by muffling, the narrower portions of the cam



Packard Ignition Cam.

face come into operation, gradually and proportionately, of course, by the action of the centrifugal governor, thus giving an equal duration to the spark, and, owing to the spiral construction of the cam face, also shifts the time of sparking.

Uses Water-Cooling Tubes

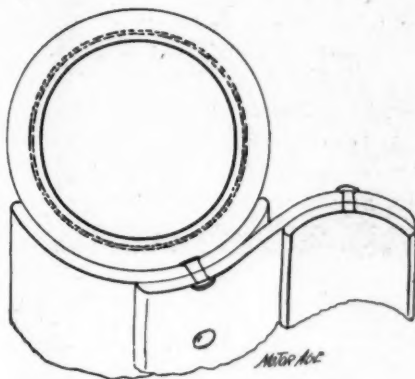
Another feature which is found on the Packard carriages which is not commonly seen in this country, is the radiation tubes. Twelve of these are placed in the forward part of the carriage, under the foot board. These tubes are of copper about half an inch in diameter by thirty inches long and are provided with copper flanges about two inches in diameter and a quarter of an inch apart. These tubes, according to the statement of Manager J. W. Packard, are not only sufficient to cool the water so that it does not have to be renewed oftener than once a day, even when the carriage is driven continuously—and the water supply is only three gallons, at that—but ten tubes will perform the cooling equally well. The water is kept in circulation by a small rotary pump of the Sharp & Smith type.

The new carriage is fitted with the company's new rim brake. An auxiliary brake rim is fitted to the inside of each rear wheel, as shown in the illustration, and a large brake shoe is applied to this rim. This is an exceedingly durable and effective arrangement and absolutely safe, being dependent on none of the other mechanism. The usual band brake is provided on the forward countershaft and is operated by the single hand controlling lever. The rim brakes are operated by an auxiliary foot lever.

Wheel steering is fitted to the new machine, as the makers feel satisfied that this is necessary in machines that are designed to travel in excess of twenty miles an hour, although levers are perfectly satisfactory below this speed. This wheel steering is fitted to the standard carriage as an extra.

Oiling Devices

All bearings and oil cups are supplied with oil from a single reservoir which carries a supply sufficient for 150 to 200 miles. By an ingenious arrangement, the supply of oil is automatically cut off by stopping the engine and a cock releasing the pressure in the engine cylinder is



Packard Rim Brake.

opened at the same time. When the engine is started, the closing of this release cock opens the cock in the oil tank. Thus, it will be seen, it is impossible to run the engine without the proper supply of oil being provided, so long as the oil tank is not empty, and so is equally impossible

to allow the oil to flood the engine and carriage when the engine is not running.

An Adjustable Piston Rod

A novel feature of the carriage is the adjustable piston rod, which may be lengthened or shortened to give a greater or less compression to the explosive charge, if such be desired.

Double sets of batteries are provided for the ignition, either of which can be connected by a simple switch. The carbureter is of the Longuemare type and is constructed in the works at Warren.

The frame of the machine is ball-jointed throughout and is consequently very flexible, being designed for high speeds on rough roads. The wheels are thirty-six inches, all around, and are provided with four-inch pneumatic tires.

• Can Carry Five Passengers

A detachable dos-a-dos seat is provided and the machine is amply strong and powerful to carry four or five passengers.

The carriage is undoubtedly more powerful and more speedy than will be ordinarily required, but Manager Packard believes that there is a growing demand for such a machine from experts. The new model is designed to rank with the high-priced French machines, but is vastly more simple and better adapted to American roads. The net price, complete, is \$2,000.

Reasons for Great Power

It is not strange that a firm located at Warren should turn its attention to the building of carriages which are powerful, for the roads around this historic Ohio town are about the worst that will be found anywhere in the United States—at least for motor-vehicle use. Normally, they are feet—not inches—deep in sand, while grades are plentiful. A carriage that will successfully navigate such roads can surely be depended upon to go anywhere. This their standard model with its eight horsepower motor will do con-

sistently, as demonstrated on more occasions than one to representatives of The Motor Age.

In speaking of the future of their business, Manager Packard said: "We have been going ahead slowly. A long time ago we began our experimenting. Finally we produced what appeared to us to be an approximately perfect carriage. Then we made a number of them and sold them, believing that the best tests we could obtain would be those which would be given in actual use by actual purchasers—and we were prepared to stand back of our goods. Carefully as we had worked out the problem, we found that there were a number of small things that needed changing.

Trouble With Mechanical Men

"Strange as it may seem, we have had more trouble with the carriages that found their way into the hands of mechanical men—and there were several that did—than with those belonging to men who made no pretense of knowing anything about mechanical matters. The trouble with the mechanical men is that they know too much—or think they do. They are not content to follow the rules that we laid down for the operation of the carriages with implicit confidence, while the more ignorant, mechanically, are. The result has been that most of the repairs and changes that we have been obliged to make were in carriages that were owned by mechanical men.

Confidence in the Average Citizen

"Having been through this experience, we have much more confidence in the ability of the average citizen to run a motor-vehicle without trouble than we had at first.

"We are now preparing to go ahead with the manufacture of our carriages on a much larger scale and by next spring will be able to supply a considerable demand."

CONSTRUCTION OF A GASOLINE MOTOR

THE PRACTICAL CONSTRUCTION OF A FOUR-HORSE-POWER AUTOMOBILE GASOLINE MOTOR WITH TWO OPPOSED CYLINDERS, ACCOMPANIED BY WORKING DRAWINGS.
BY L. ELLIOTT BROOKES

PART II.

If the construction of this motor is looked into carefully, it will be noticed that there are no right hand or left hand parts, so common in other two-cylinder motors, either of the side-by-side or opposed-cylinder types. And it has been the object of the writer, after spending a good deal of time and no little study, to construct a double-cylinder motor in which all parts would be interchangeable. That means that the cylinder cover and valve chamber at one end of the motor, is an exact duplicate of that at the other end, likewise the cylinders, pistons, connecting rods, admission and exhaust valve chambers, gears, ignition cams, casings, etc. In fact all parts of the motor, with the exception of the fly-wheel, crank-chamber, crank-chamber cover, and cam gear pinions, are in pairs. This is an important factor and an essential one, where the manufacture of motors is contemplated on a large scale, as only half the number of jigs and templates are needed for the construction of such a motor, as against the type of double cylinder motors generally in use at the present time, where nearly everything is made right hand and left hand. And the importance of these features in the motor under discussion will not only be apparent but appreciated by those engaged in manufacturing.

Wherever a casting is to be machined the drawings indicate this fact plainly by a capital letter F, with an arrow pointing to the place to be finished. This not only enables the machinist to see at a glance what to do, but also shows the pattern maker just where to allow the necessary finish on the patterns.

Before using any iron castings they should be placed in a pickle composed of a twenty percent solution of sulphuric acid and water, and allowed to remain in it from eight to ten hours, at least.

For this purpose get a wooden wash-tub and give it two good coats of asphaltum inside, and allow it to dry at least sixty hours before using.

This process will facilitate the machining of the castings wonderfully, save tools and give nice, clean pieces free from sand and grit; but, above all things, remember to put the acid in the water, not the water into the acid.

The first part of the motor to be taken up is the crank chamber, as outside of the fly wheel, it is the largest piece to be made, and also makes a good point to start from, as it is really the foundation piece of the whole motor.

Fig. 4 shows a side elevation of the crank chamber, half in section and half full side view, showing the cover which carries one of the crankshaft bearings. Fig. 5 shows an end elevation of this cover, also half in section and half full end view. Fig. 6 also shows an end view of the crank chamber in the same manner.

In making the pattern for this piece allow only 1-16 of an inch to the foot for shrinkage, as, on account of the bulkiness of the core, this casting has been found to shrink considerably less than the usual amount.

Have these castings made of a very high grade cast iron. Even if it costs a little more, it will pay, in the long run, to use good material.

The first operation on the crank-chamber is to plane off the feet; this can be done nicely on a shaper if a planer is not handy. Be sure to pay close attention to the laying out of the side and end holes which are to be bored, and see that they will finish up properly before the feet are planed. Next clamp the crank chamber by its feet on the carriage of a lathe, which must be large enough to give the proper distance from the center line to the feet. Use a boring

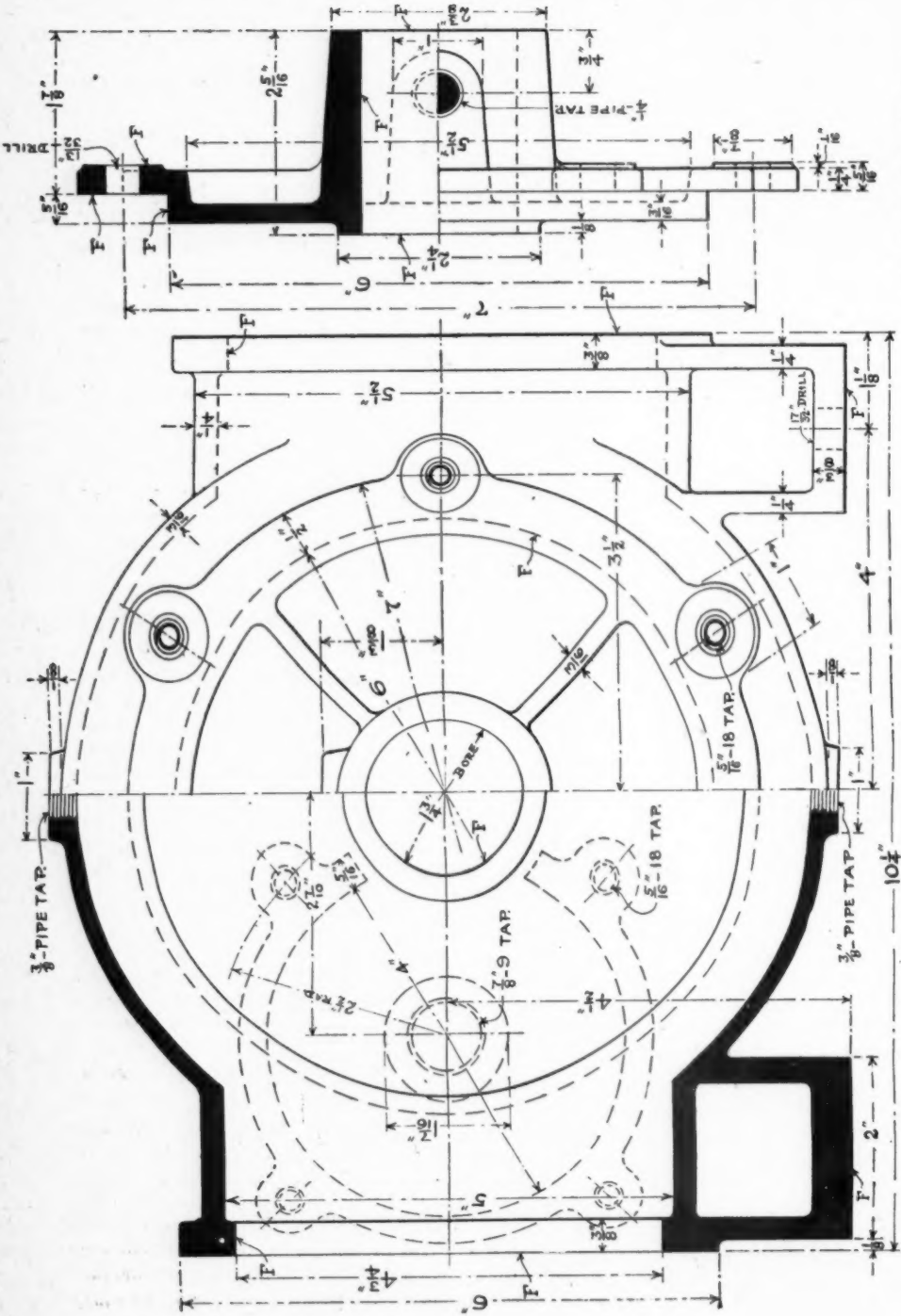


FIG. 4.—CRANK CHAMBER.
1—Cast Iron.

Fig. 5.—Crank Chamber Cover.
1—Cast Iron.

bar not less than $2\frac{1}{2}$ inches in diameter, so as not to have any chatter in the work on the finished faces. Bore out and face both ends of the crank chamber, but do not turn it around to complete the operation. Use a bar long enough to get at both ends, or if not convenient use a shorter one, and reverse it between the centers, so as to finish the other end of the crank-chamber.

Next hold the crank chamber in the lathe chuck (a fourteen-inch lathe will swing it), with the cover side out, towards the tail stock. Before doing this, however, put a strip of wood in the hole about to be bored, and lay out the six-inch circle correctly with relation to the feet and the end holes, according to the drawings. By using a scratch awl or a sharp pointed piece of steel, the cover side can be brought exactly at right angles to the ends, by turning it around half way and allowing the pointer to touch the edge of the $4\frac{1}{4}$ -inch hole on one end, exactly at its horizontal center line, then reversing and applying the pointer to the other $4\frac{1}{4}$ -inch hole, repeating this operation until the pointer shows exactly alike at both ends. After facing and boring the cover opening to the figures on the drawing, finish the facing of the $1\frac{1}{4}$ -inch hole in the hub end next to the chuck, to the figures also, which makes it 5.9-16 inches distant from the cover seat. Then bore out the $1\frac{1}{4}$ -inch hole exactly the size. Next take the cover shown in Figs. 4, 5 and 6, hold it in the chuck by the hub and bore out the hole to size, same as in the crank chamber hub which is to be $1\frac{1}{4}$ inches exactly, then put the cover on mandrel, and finish according to drawing. Now lay out the six 13-32-inch holes in the cover, put the cover in its place in the crank-chamber, line it up carefully and then mark off the holes for the studs, which are shown in Fig. 8. Do not attempt to use any ready made studs which can be generally picked up in the supply houses, as no two of them are alike, and poor work will be the result of any attempt to use any make-shifts. Use $\frac{3}{4}$ -inch cold drawn or Bessemer steel rod, with a three-jawed chuck in first class shape and true. These studs are very easily made. Simply take a

length of the rod and use a small lathe with hollow spindle. Allow about $\frac{3}{4}$ of an inch of the rod to stick out; cut the 5-16-inch, 18 thread, then move out in chuck, measure off 1-16 of an inch more than the correct over-all length of two studs and cut off. Finish the required number this way first and then cut the 5-16-inch, 18 thread on the other end of the short rods. After finishing this operation, carefully center and cut the required amount of thread on the $\frac{3}{8}$ -inch part in the center, long enough for two studs, then cut in two, and afterward round off the outside ends.

After screwing in the studs and putting the cover in position upon them, bolt in place with $\frac{3}{8}$ -inch semi-finished hexagon nuts. Put the whole on an $1\frac{1}{4}$ -inch mandrel, and turn off the facings for the gear cases, bosses for cam gear studs and end of hub on this side of crank chamber, which is not yet finished. These facings, etc., are shown plainly at the left hand side of Fig. 6, to their proper dimensions. Locate the tap-holes for the cam gear studs as shown, and drill and tap them $\frac{7}{8}$ -inch, 9 threads.

This is all that can be done to the crank chamber until some of the other work in hand is a little more advanced, so it must be set to one side for the present, and the bushings for the crank shaft journals taken up, which are shown in Fig. 7. These must be made of phosphor bronze of a very good quality and very tough. When making this pattern allow 3-16 of an inch to the foot for shrinkage. To finish these bushings is a very simple operation. Hold in a chuck by the straight end, bore out very carefully to size, which is 1.5-16 inches, face off flange end and do not forget the 3-32-inch round corner shown in flange end. After boring, place on mandril and finish all over outside and at the other end, making them a nice tapping fit for the holes in the crank chamber hubs. Drill $\frac{1}{4}$ -inch oilways where shown. The 9-16-inch studs shown in Fig. 9 are made exactly in the same manner as those shown in Fig. 8 and are to go in the end flanges of the crank chamber.

The cylinders will next claim attention. Fig. 10 shows an end view from the valve chamber end; Fig. 11 is verti-

cal longitudinal section of the cylinder showing water jacket; Fig. 12 shows the crank chamber end of cylinder; Fig. 13 shows vertical cross section of cylinder through water jacket, before the holes for the pipe connections have been tapped, and Fig. 14 shows a plan or full top view of the cylinder.

jacket core, and the bosses shown in Fig. 13 can be left in it permanently, as they will do no harm in the other half core, but would cause a good deal of trouble if left out. This pattern must be parted longitudinally on the line of the lubricator and water jacket bosses.

To machine these castings, hold in

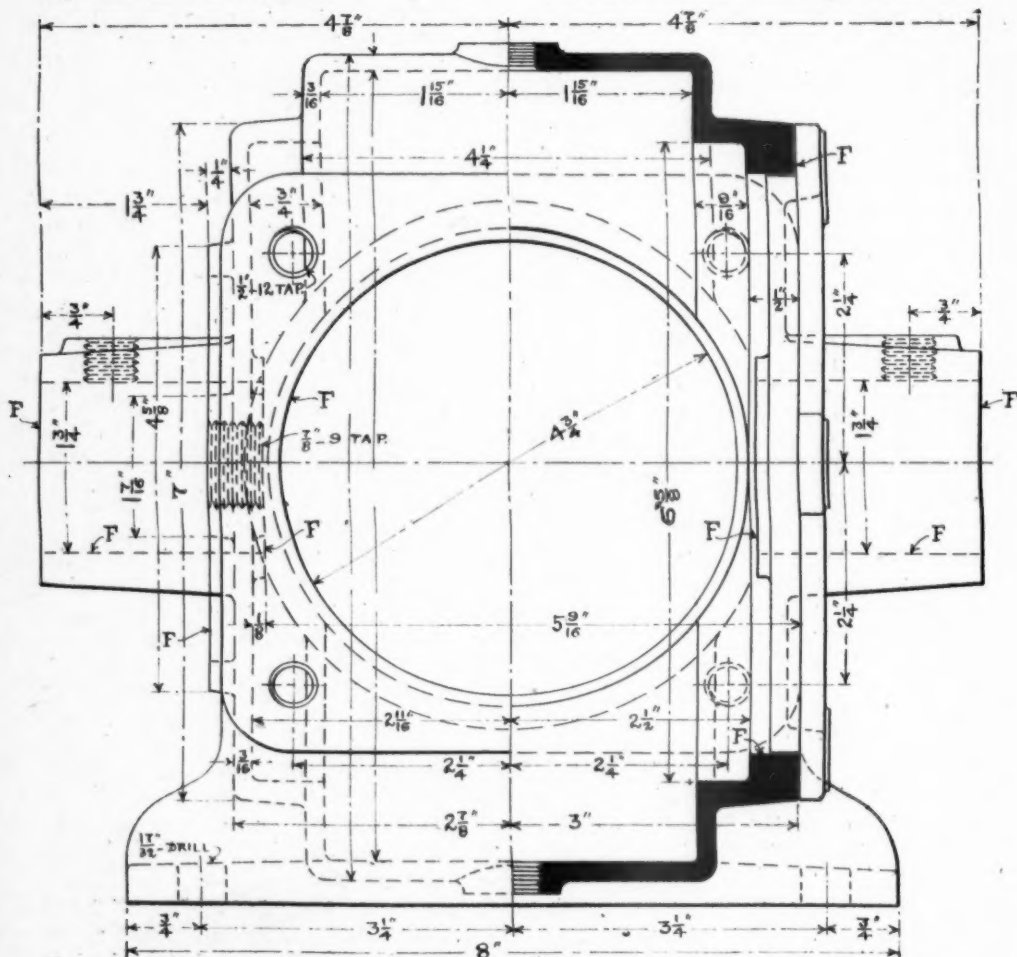


FIG. 6.—CRANK CHAMBER—END VIEW.

In making this pattern observe the same rule as for the crank chamber for the shrinkage. In Fig. 13 four small bosses are shown inside the water jacket, at the valve chamber end of the cylinder. They must be put in water jacket core box. They are to give extra depth to the tap holes in which fit the studs that are shown in Fig. 15, for attaching the cylinder head to the cylinder. Only one half core box is needed for the water

chuck by the head or valve chamber end and true up very carefully. First bore out the inside of cylinder, taking not less than three cuts, then face off the flange and shoulder to sizes given in the drawings. Before taking the cylinder out of chuck, put a slight flare on the mouth of the 4-inch bore, about 3-16 of an inch back and 1-16 of an inch slant, to allow of easy admission of the piston rings, when putting piston in place, and also to

prevent the oil being scraped off the piston. The other end can be done very nicely in a shaper by setting the flanged end on parallels and bolting it down securely to the table. Next lay out the 19-32-inch holes (Fig. 12) in the flanges for the studs shown in Fig. 9, and also the 7-16-inch 14-thread tap holes in the cylinder head, for the studs shown in Fig. 15.

The cylinders can now be put into place at each end of the crank chamber, carefully levelled so as to stand square with the feet of the latter, and the holes marked through on to the crank chamber flanges, for the 9-16-inch studs (Fig. 9). After drilling and tapping these holes as shown, screw the studs firmly in place,

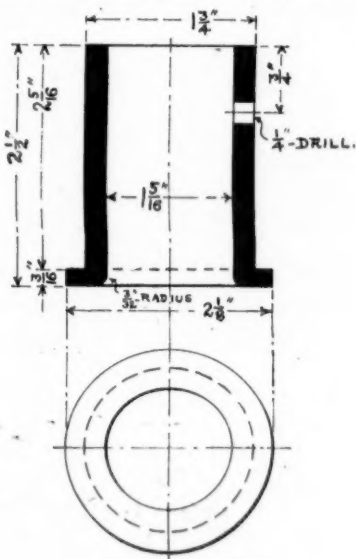


Fig. 7.—Bushing.
2—Phosphor Bronze.

bolt on the cylinders, using 1/2-inch hexagon nuts, tapped out 9-16-inch, 12 threads. This is to keep clear of the fillet in the corner of the cylinder flange. Now the 1-inch pipe tap holes in top and bottom of the water jacket can be drilled and tapped and also the 3/8-inch pipe tap in top and bottom of the chamber portion of the crank chamber; next the 1/4-inch pipe tap in the hubs for the crank shaft bushings in the crank chamber. These are for solid grease cups with 1/4-inch pipe tap. Lastly the bosses on top of the cylinders next to the flanges are

to be tapped, 1/4-inch pipe tap, as well. These are for lubricators for the cylinders, also the holes in the feet which should be 17-32-inch for 1/2-inch bolts. It is much easier to do this drilling and tapping when the cylinders and crank chamber are assembled than when sepa-

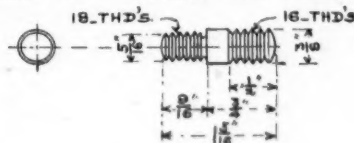


Fig. 8.—Cover Studs.
6—Steel.

rate, and a much more accurate job is insured.

We can now make the studs shown in Fig. 15. These are for attaching the cylinder head to the cylinders. Drill and tap holes for them, screw tightly into place and then the cylinders are ready to have the heads put in place.

The cylinder and crank chamber, still bolted together, with cover and bushings in place, can be set to one side. Before doing so see that all chips or particles of iron or grit have been thoroughly removed and the inside of the cylinders carefully oiled to prevent rusting.

The next on the list will be the pistons and piston rings, shown in Figs. 17, 18, 19 and 20. The rings must be made first to insure a nice fit in the pistons. To make the ring, a special blank is required, shown in Fig. 16. The casting for this should be of a hard, springy iron, free from grit and blowholes.

Hold in the chuck by the straight part and face off the back of the flange. Then clamp to the face plate of the lathe with 1/2-inch bolts in the 9-16-inch slots, turn down the outside of sleeve to 4 3-16-inch

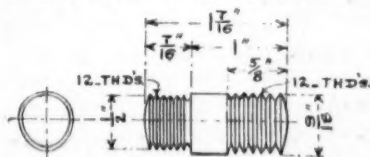


Fig. 9.—Flange Studs.
8—Steel.

diameter, then loosen bolts slightly, and set over eccentrically about 3-64 of an inch. After setting over and tightening up the bolts, to get the adjustment correctly, take a slight cut in the hole,

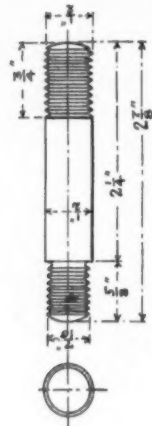
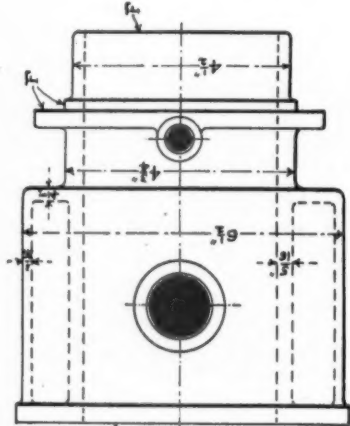
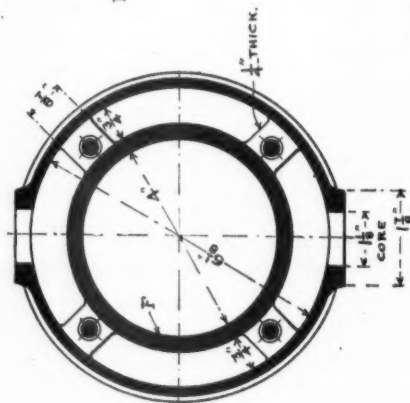
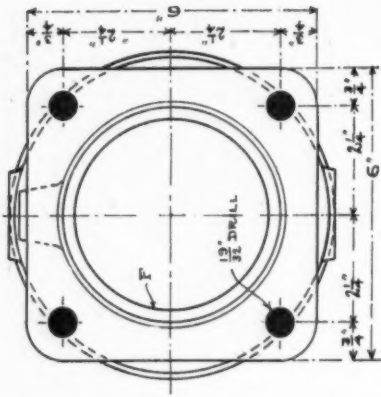
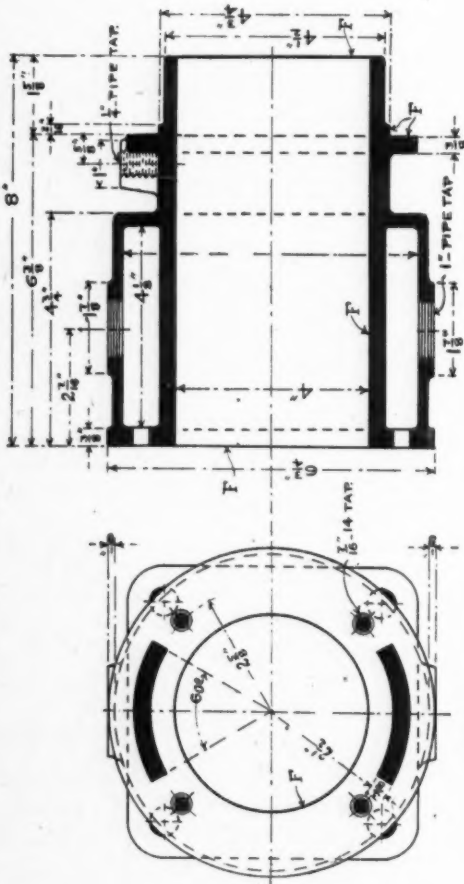


Fig. 15.—Cylinder Head Studs.
8—Steel.

CYLINDER.
2—Cast Iron.

about 1-16 of an inch in, then half the difference between the thick and thin sides of the sleeve, when measured at exactly opposite points should be 3-64 of an inch; if not quite exact, a second adjustment will generally make it right.

After the rings are cut off, carefully remove all burrs and sharp corners with a fine file, and then cut open at an angle of forty-five degrees. Cut out 3-16 of an inch, taking care to have the slanting edges parallel, so that when the ring

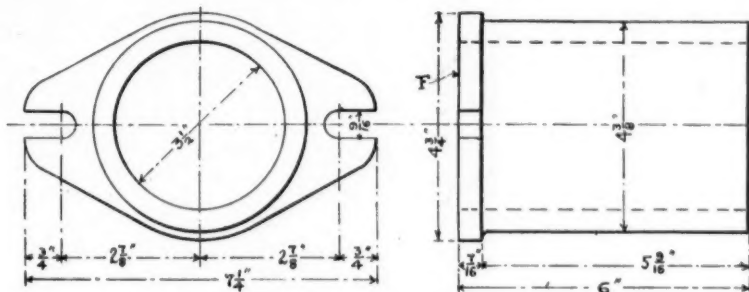


FIG. 16.—BLANK FOR PISTON RINGS.

1—Cast Iron.

Now bore out the hole 3 25-32 inches in diameter. Then take a cutting off tool about 3-32 inch wide at the point, with plenty of clearance back of the cutting edge, so that when correctly set it will make a cut absolutely at right an-

is closed together the slant edges will contact perfectly. After this is done take some soft iron wire and close each ring up tight by wrapping the wire around tightly and twisting the ends, taking great care to keep the sides of the ring

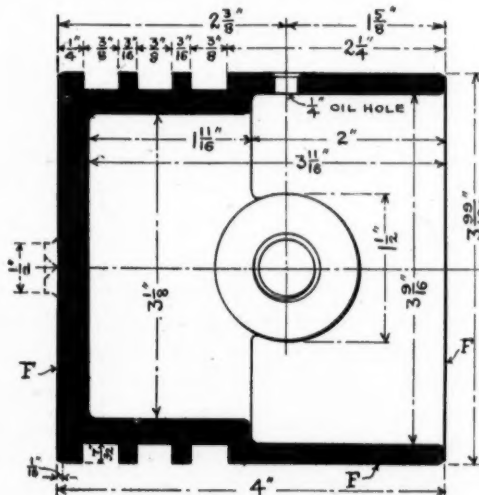


FIG. 17.

PISTON.
2—Cast Iron.

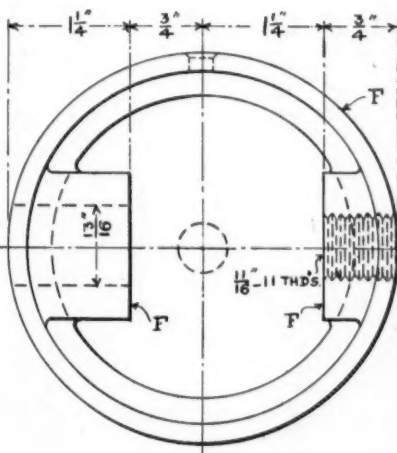


FIG. 18

gles with the side of the sleeve, and cut off the rings 3-8-inch wide. Two or three extra ones may be cut off (as there is plenty of stock on the sleeve for about ten rings) to allow for breakage or a misfit.

in line at the cut. Then take some strips of tin 5-16 of an inch wide and one inch long, and solder inside the rings across the cut. Make a very neat joint and remove any lumps that may remain after the strip is soldered in place. Remove

the wire and the rings are ready for re-turning, on the outside, to insure a perfect working air and gas tight fit in the cylinders. There is no way known to the writer except the operation now being described, which will accomplish this result. Figs. 21 and 22 show the jig necessary for the completion of these operations. It is of cast iron and a pattern is necessary for both jig and washer used to clamp the ring on the jig. A steel stud as shown with center drill in the outside end, must be made ready to put in place while the jig is being made. To make this jig, first face off the back and then secure to the face plate of the lathe by two $\frac{1}{2}$ -inch bolts. Turn the 3 15-16-inch shoulder, finish the face to size, and run a small drill in the center. before using the tap drill, to insure its running true. Tap out a hole in the face 5-8 inch. 11 threads, to fit the threads on shoulder end of stud. Screw stud tightly in place. The washer for the jig can be drilled in a drill press and put on a mandrel and faced on both sides to size. Now slightly loosen the bolts holding the jig in place, and set over to the right the amount of eccentricity, or $\frac{3}{64}$ of an inch. Having determined this, bolt tightly in place and turn off the eccentric portion to 3 21-32 inches. Then loosen the bolts, bring the back center of the lathe up to the jig and put it in the center drill hole in the stud. Force the point of the back center firmly against the stud and lock the tail stock, turn jig around so as to ensure its being central, and then rebolt jig in place and remove tail stock and center.

It is now in order to turn down the rings, which have been previously closed and soldered. Locate a center punch mark on the jig as shown in Fig. 21, and

place a ring upon the eccentric portion of the jig, with its joint coincident with the center punch mark. At two points equally distant from the center punch mark, and around the circumference of the eccentric portion of the jig, between it and the ring, insert two strips of tin 5-16 inch wide by $1\frac{1}{2}$ inches long and thick enough to hold the ring in position upon the jig. Put on the washer and nut, clamp the ring up lightly and turn it around and true it up by tapping it slightly at the proper places. When practically true, tighten up the nut firmly and turn down to exactly 4 inches in

diameter, or to fit the cylinders which should be of this dimension. This will give an almost perfect ring, and one in which the pressure is practically uniform all around the inner wall of the cylinder.

Having cut off the desired number of rings and finished them in the manner above described, they should be numbered upon the inside at the thickest

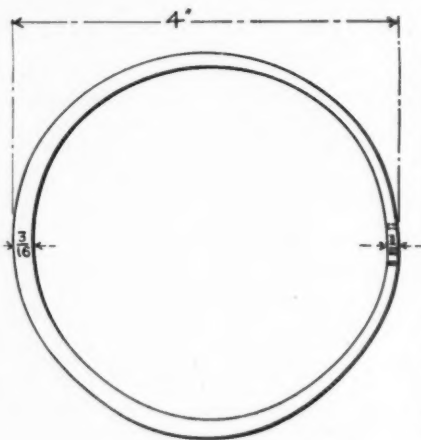


Fig. 19.—Piston Ring.
6—Cast Iron.



Fig. 20.

part either with a center punch or figures, consecutively 1, 2, 3, etc.

The pistons come next in order. Fig. 17 shows a vertical longitudinal section of the piston, and Fig. 18, an end view of the open end of same. The inside of the piston must be made with a core. A solid pattern must be provided for the piston, with a print for the open end. Do not omit the small dotted boss shown on the back of the piston in Fig. 17, as it is very essential. The piston castings must be of a fine quality of soft grey iron and free from blowholes and impurities.

First hold the pistons in the lathe chuck by the back end, true up carefully, and bore out the 3 9-16-inch portion to $\frac{3}{8}$ inches for a distance of about $\frac{5}{8}$ to $\frac{3}{4}$ of an inch. Make this measurement ex-

and the dead center in the end of the tap to guide it. The bosses inside the

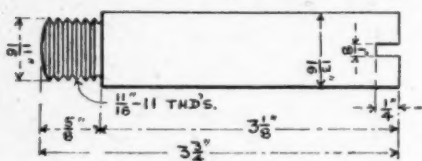


Fig. 23.—Wrist Pin.
2—Steel.

piston may be very quickly faced in the

shaper to size, taking care to keep the planing at right angles with the holes. The wrist pin, Fig. 23, should be made from cold drawn or Bessemer steel and should be a nice fit in the hole.

It may be well to state before going any further that all standard supplies, such as machine screws, cap screws and semi-finished hexagon nuts, are not detailed, but are only specified in connection with the details to which they belong; for the most part they are shown in Figs. 1, 2 and 3.

WEEKLY PATENT OFFICE BUDGET

DESCRIPTIONS OF DEVICES WHICH ARE CLEVER AND OF OTHERS WHICH ARE NOT—SYSTEM OF WIRING FOR AN ELECTRIC VEHICLE—RISIBLE ELECTRIC BICYCLE

J. W. Eisenhuth, of New York City, who styles himself the "banker-inventor," is one of the week's patentees. His invention is a driving and steering mechanism and running gear frame for an automobile cab of the hansom pattern. The scheme he presents is developed rather loosely, several very important items in motor-vehicle construction being passed by unnoticed.

P. J. Collins of the Collins Electric Vehicle Co., of Scranton, Pa., is the patentee of an electrically driven vehicle whose traction wheels are severally propelled by independent motors by the regulation of which the steering is accomplished. In the synopsis given below of the patent the manner of wiring such a motor mechanism is described.

A ridiculous electric bicycle by a German inventor, a four-wheel friction drive mechanism by the inventor of a previous device of the kind, a mediocre creation in the line of spiral or worn gear transmission and a solid rubber vehicle tire complete the list of patents for the week.

The complete specifications, claims and drawings of any patents will be furnished by the patent office at Washington for five cents each. Persons sending for patents should address their letters "Commissioner of Patents, Washington, D. C.,"

and should enclose five cents for each copy of every patent desired, and should state the numbers and dates of the patents. Each patent described in The Motor Age is preceded by its number and date. The date of any patent described in earlier issues, in which dates were not given, can be ascertained by deducting nine days from the date of the paper in which it was described.

WIRING AN ELECTRIC WAGON

Letters patent No. 656,389, dated August 21, 1900, to Patrick J. Collins, Scranton, Pa., assignor to the Collins Electric Vehicle Co., same place; electric vehicle driven and steered by independent motors. Sixteen claims allowed.

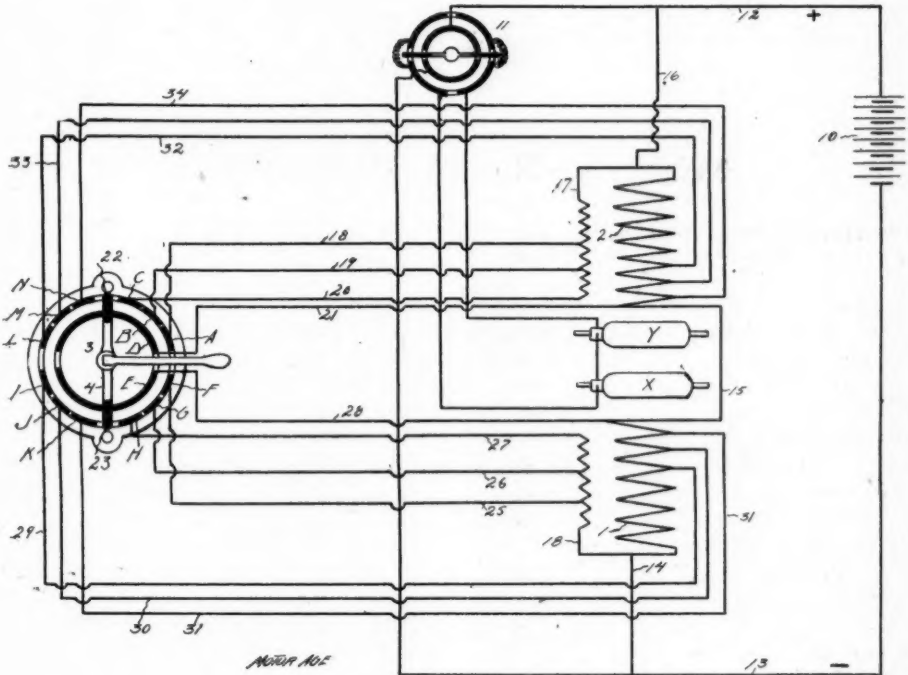
This invention is by the patentee of the steering mechanism shown in The Motor Age a week ago, whereby in making short turns the main front axle is turned upon a central fifth wheel as well as the stub axles which support the steering wheels being swung in relation to the main axle. The subject of the present invention comprises an electric motor-vehicle each of whose rear wheels is driven by an electric motor and each of whose front wheels is supplied with an auxiliary motor which may be used at

any time to assist in swinging the steering gear, which is similar to that constituting the previous Collins patent.

One portion of the patent specifications describes the manner in which the circuits are arranged so that the speeds of the motor armatures upon the opposite sides of the vehicle are varied relatively to each other for the purpose of steering by running one drive wheel faster than the other. As this is a subject which has

to drive the vehicle in either direction, and by means of the circuits connected with the steering switch 3 the fields may be varied simultaneously, so that as the strength of one field is increased the strength of the other field will be correspondingly decreased, thereby inducing the desired relative changes in the speeds of the armatures.

The fields are connected in series with each other by circuits 14, 15 and 16. A



ELECTRIC CIRCUIT IN COLLINS' VEHICLE.

been slightly touched in print a perusal of the following outline of the Collins method of wiring will doubtless prove interesting:

In the diagram, X and Y represent the armatures which are connected to the rear wheels, and 1 and 2 represent corresponding field coils. The armatures are connected in series to the battery 10 through a reversing switch 11 and the mains 12 and 13. By means of the reversing switch, which is arranged within the vehicle convenient to the operator, the direction of rotation of the armatures may be controlled in the usual manner

resistance coil 17 is connected at one end to the wire 16 and wires 18, 19 and 20 connect contact points A, B and C of the steering switch 13 with different points of the resistance coil. A wire 21 connects the semi-circular contact piece D with the wire 15, connected to the inner terminal of the field coil 2. The switch arm 4 is provided with suitable metallic ends 22 and 23, adapted to connect the inner semi-circular contact pieces D and E with the concentric contact pieces.

It will be seen that if the arm is moved from the central position shown onto the

contact piece C the entire resistance 17 will be thrown in shunt to the field 2 through the wires 21 and 20. This will weaken said field and cause the armature Y to rotate faster than before. The continued movement of the arm will shunt the current through the contact piece B and wire 19 and a portion of the resistance 17 will be cut out, thus still further weakening the field, and the movement of the arm onto the contact piece A will cause the current to traverse the wire 18 and a still smaller section of the resistance, thus again weakening the field.

The resistance 18 is connected in a similar way by wires 25, 26 and 27 to contact points F, G and H, respectively, and the inner terminal of the field is connected by a wire 28 to the semi-circular contact plate E. The movement of the end 23 of the arm, therefore, over said contact points H, G and F in succession will correspondingly weaken the field 1 and cause the armature X to rotate faster.

In order to strengthen one field and simultaneously weaken the other, there are upon the switch a series of contact pieces I, J and K, which are arranged diametrically opposite to the contacts A, B and C, respectively, in a similar series of contact pieces L, M and N, which are arranged, respectively, opposite to the contacts F, G and H. The contacts I, J and K are connected by wires 29, 30 and 31 to different points of the field coil 1, and the contact pieces L, M and N are connected by wires 32, 33 and 34 to different points of the field coil 2. When the arm 4 is turned so that the bridge piece 22 will connect the contact pieces C and D a portion of the current will be shunted around the field 2, weakening the latter in the manner previously described, and the field 1 will be strengthened by reason of the short-circuiting of the coils upon the field between the points of connection of the wire 31 and the wire 15, the current passing through said wire 31, contact piece K, bridge-piece 23, contact E, and wire 28 to the wire 15. This short-circuiting of a section of the field 1 reduces the resistance of the field and permits a larger quantity of current to circulate in the re-

maining coils, thereby strengthening the field.

It will be seen that the movement of the arm 4 onto the contact piece J will short-circuit a greater portion of the field 1 through the wire 30 and that the still further movement will short-circuit the larger section of the field coil through the wire 29, and the increased volume of current which is permitted to pass by reason of the reduction in resistance will increase the strength of the field 1. It is clear without further description that the movement of the arm in the opposite direction will cause an increase in this strength of the field 2 and a corresponding decrease in the strength of the field 1 and that while the arm is in the central position the field strengths will remain alike. As the switch arm 4 turns with the operating lever a movement of the latter to the right will cause an increase in the speed of the armature X upon the left and a decrease in the speed of the armature Y upon the right, and a movement of the lever to the left will cause an increase in the speed of the right-hand armature and a decrease in speed of the left-hand armature. When the lever is held in the central position, both armatures will turn at the same speed.

If, as in the Collins vehicle, the steering lever be connected to the front wheel steering mechanism as well as to the electric steering switch, the turning of the steering handle to the right therefore turns the front wheels to guide the vehicle to the right, and also turns the arm of the steering switch so as to increase the speed of the left hand driving wheel and to decrease the speed of the right hand driving wheel. When the handle is turned to the left the front wheels are turned to guide the vehicle to the left, while the speed of the right hand driving wheel is simultaneously increased and that of the left hand wheel is decreased, resulting in an easy turning of the vehicle by simply swinging the lever toward the side to which it is desired to move.

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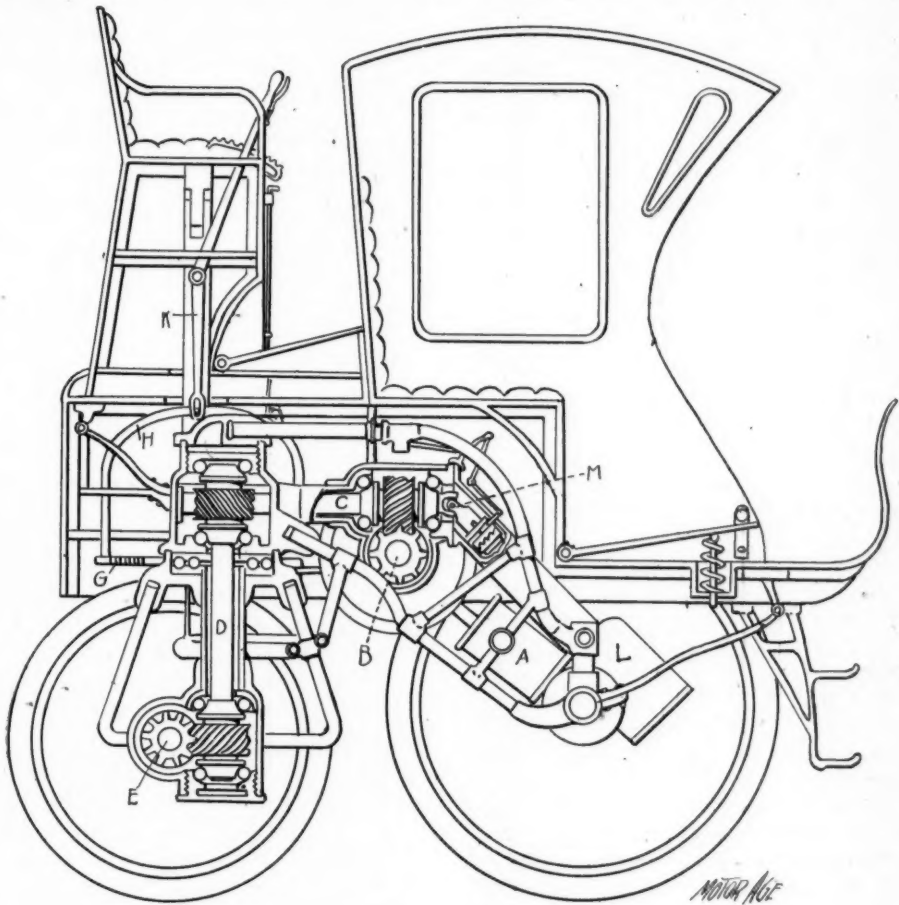
EISENHUTH'S MOTOR CAB

Letters patent No. 656,396, dated Au-

gust 21, 1900, to John W. Eisenhuth, New York City, assignor, by mesne assignments to the Eisenhuth Horseless Vehicle Co., same place; rear driving and steering hansom cab. Eleven claims allowed.

This vehicle is arranged to be ordinarily driven by the gear wheels, through

forward portion of the vehicle frame and whose piston rods connect with cranks at the respective ends of a transverse shaft B. A pair of spiral gears transmits the rotation of the shaft B to a longitudinal shaft C, which in turn, through the medium of another pair of spiral gears, drives a vertical shaft D, directly



SECTIONAL VIEW OF EISENHUTH'S CAB.

which, also, the steering is accomplished, but is so constructed that the driver can at will cause the motive power to act upon the front wheels as well and thus obtain four-wheel traction for difficult road passages.

The inventor does not specify the character of the motive power employed. The patent drawing shows two oscillating cylinders, A A in the accompanying illustrations, which are pivoted in the

in front of the center of the rear axle. Spiral gears are also employed to transmit the motion of shaft D to the rear axle E. The arrangement of these parts is clearly shown in the illustrations.

The rear axle E is supported by a depending tubular frame whose vertical reaches are attached to the lower member of an annular ball steering ring or fifth wheel directly beneath the housing for the upper gears of the shaft D. This

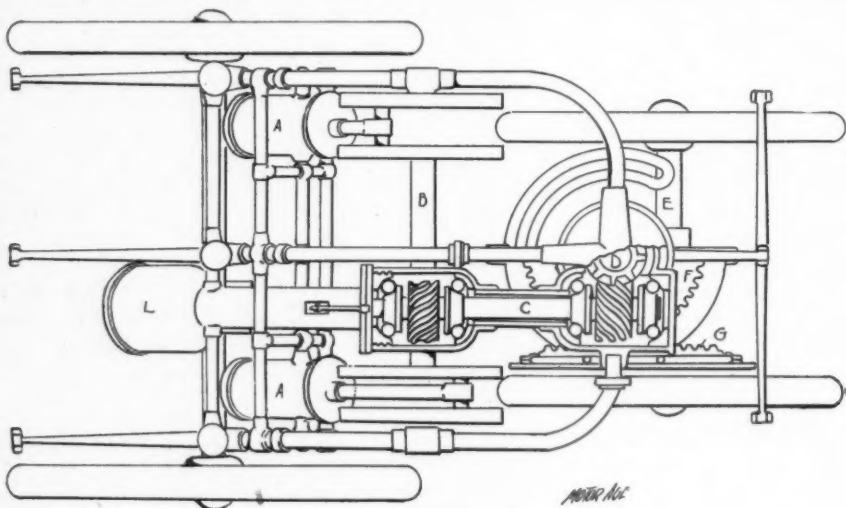
steering frame is operated by a gear segment F, a rack G, a yoke H and a hand lever K. A tubular segmental loop rigidly attached to the main frame engages the forward reach of the axle supporting frame by means of an anti-friction roller and thus braces the axle frame at all times.

The forward end of the shaft C is fitted with an universal joint M whereby the said shaft is connected to an obliquely disposed shaft extending to a point over the front axle where a pair of spiral gears in a casing L transmits the driving movement to the front wheels. A clutch connection between the upper and lower

gust 21, 1900, to Albert Hansel, Zeitz, Germany; electrically driven bicycle. Three claims allowed.

Since the coaster brake has been applied to bicycles an apt catch phrase to quickly explain one of its advantages has been originated. It is: "Ride all day, coast half-way." Mr. Hansel has put the coaster brake out of the running for he has devised a motor and pedal driven bicycle on which one may "Coast like h—l right up the hill." Albert's world beater is shown in the accompanying illustration.

The general principle of the thing is not new. Supported within the front frame of the bicycle is a small electric motor



PLAN VIEW OF EISENHUTH'S CAB.

sections of this oblique shaft and a series of links and bell cranks, ending at the driver's seat in a hand latch, furnish means for throwing this forward driving connection in and out of gear at will. The frame is constructed so that there is ample room for swinging the rear wheels as far as desired under the vehicle body in making short turns.

No differentials are specified for either front or rear axle, but the patent drawings show a feature whose apparent advantage may overbalance this shortcoming in the driving mechanism; this feature is a spring foot board for the passenger.

AN ELECTRIC BICYCLE, FORSOOTH!

Letters patent No. 656,323, dated Au-

gust 21, 1900, to Albert Hansel, Zeitz, Germany; electrically driven bicycle. Three claims allowed.

whose armature shaft is connected by a belt to a pulley on a stub shaft projecting from the side of the seat mast tube. On the same shaft is a small sprocket wheel over which runs a chain connecting with a sprocket on the rear wheel hub. There is also the usual bicycle sprocket and chain connection between pedal crank shaft and rear wheel.

A lever underneath the saddle allows the rider to throw the motor driven pulley on the seat mast in and out of engagement with the sprocket on the same shaft. A storage battery hanging from the upper reach tube of the frame is furnished with the proper wire connections to the motor.

On level ground the cyclist is supposed to busy himself with his feet to propel

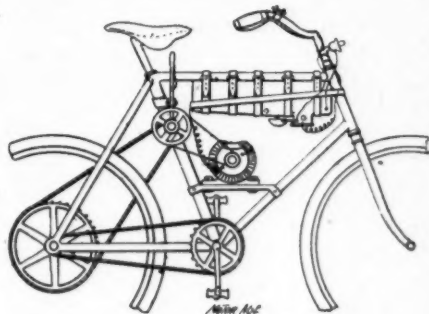
the machine. Descending hills the rider throws the motor gearing into engagement and the revolution of the motor armature, now being driven by the bicycle, acts as a brake against the momentum of the machine and also causes the storage battery to be charged with lively electromotive force. When the bottom of the hill is reached and the ascent of the next grade begun, the storage battery parts with its accumulated energy, the motor armature is whirled round and round and bicycle and rider go merrily skimming up the incline. So says the inventor, and he ought to know. He does not, however.

OTHER NEW INVENTIONS

Letters patent No. 656,491, dated August 21, 1900, to Waldo W. Valentine, New York City; power transmission device for automobiles. Eighteen claims allowed. This patent relates to improvements upon a previous invention by the same patentee and comprises a transmission device whereby a four-wheel drive is effected by means of a friction pulley on each side of the vehicle, each pulley being between the front and rear wheels and en-

gaging the tires of those wheels respectively. The earlier patent was described in The Motor Age issue of June 7, 1900.

Letters patent No. 656,483, dated August 21, 1900, to Walter Scott, Plainfield, N. J.; motor-vehicle steering and driving mechanism. Twelve claims allowed. The



Hansei's Electric Bicycle.

invention comprises constructional detail relating to worm gear power transmission from motor shaft to rear axle differential and to a bevel gear steering mechanism.

Letters patent No. 656,172, dated August 21, 1900, to James R. Colt, Batavia, N. Y.; fastener for solid rubber vehicle tire. Two claims allowed.

NEWS OF THE MOTOR INDUSTRY

WINTON DEPOT IN CHICAGO

Pleasing evidence of the fact that the automobile demand in the west is growing apace, is that the Winton Motor Carriage Co., of Cleveland, has concluded arrangements for the establishment of western offices. A commodious suite of rooms on the ground floor of the Monadnock building, Chicago, has been secured, and within a week a line of Winton carriages will be on exhibition there. The interests of this successful company, as far as Chicago and vicinity are concerned, will be in the hands of Messrs. Washburn and Cole, who are prominently identified with important

business interests in both Chicago and Nashville. Both gentlemen have been Winton owners for nearly a year and are consequently thoroughly familiar with the machine. Their local manager will be D. Weaver. Mr. Weaver is a native of Nashville and an experienced salesman. During the past three weeks he has been undergoing a thorough course of training at the Winton factory in Cleveland.

In addition to the exhibition and show rooms there will be established a Winton storage and repair depot where users of this popular hydrocarbon carriage may arrange for permanent stabling accommodations. The repair department in

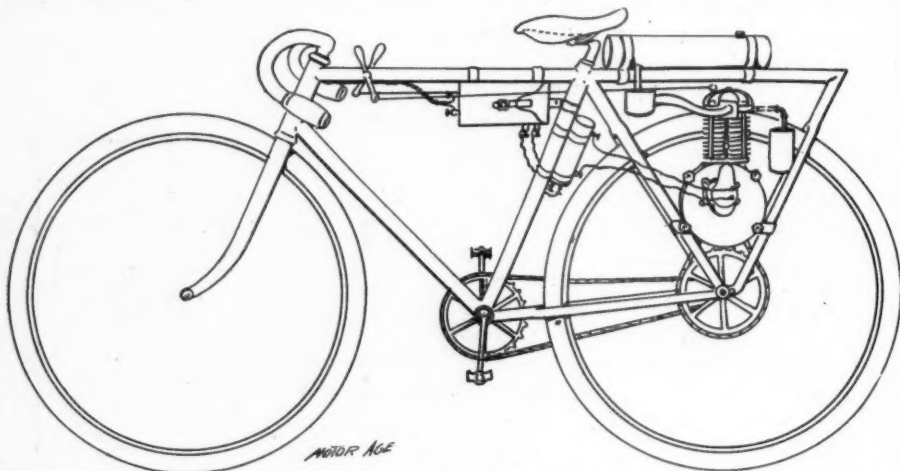
connection with the storage station will be in charge of competent mechanics who will be familiar with the perfect care of the Winton. Owners of carriages in Chicago and vicinity will appreciate this perfectly equipped establishment since it is assured, that, should anything go wrong with their motors, there will be trained mechanics on the ground who are qualified to repair damages quickly.

"Accidents are liable to happen to any machine if not handled properly," said Charles B. Shanks, of the Winton company, to a Motor Age representative in speaking of the new departure. "Matters sometimes go amiss with perfected railroad locomotives, with sewing machines and any other mechanical device,

A UNIQUE CONVERTING DEVICE

Dr. E. P. Clark, of Utica, N. Y., has constructed a motor bicycle on decidedly different lines from any that have been seen hitherto. His object has been to utilize the ordinary bicycle and to arrange the motor mechanism in a position where it will not be annoying to the rider on account of the heat. The accompanying outline illustration gives an excellent idea of the disposition of the mechanism. In writing of the bicycle, Dr. Clark says:

"It has proven satisfactory in every way. It is not strictly a motorcycle but rather an ordinary bicycle converted into a motorcycle by my attachment. This attachment consists of a piece of tubing



DR. E. P. CLARK'S ATTACHMENT.

if intelligent care is not given them. So there is also possibility of an accident to our simple single-cylinder motor-carriage if not handled intelligently. Appreciating this and desiring to benefit customers in every possible manner, we see the mutual advantages to be derived from the establishment of this storage and repair station.

"Our business in Chicago has grown rapidly during recent months and the demand for the Winton product in that section is getting stronger daily. Our storage and repair station in New York City has been very satisfactory to both customers and ourselves. Chicago patrons will have the benefits of eastern experience in this direction."

twenty inches long and of the size of the top bar of the bicycle, clamped to the seatpost and extending backward to meet a supplementary fork to which it is brazed. This fork is bolted to the rear axle, and, with the top piece and the ordinary rear forks, forms a second diamond, back of the seat-mast. To this attachment are fastened the motor, gasoline tank, carbureter, muffler, and, in fact, everything except the battery and controlling levers. The whole can easily be removed in two minutes, leaving an ordinary safety bicycle, ready for riding.

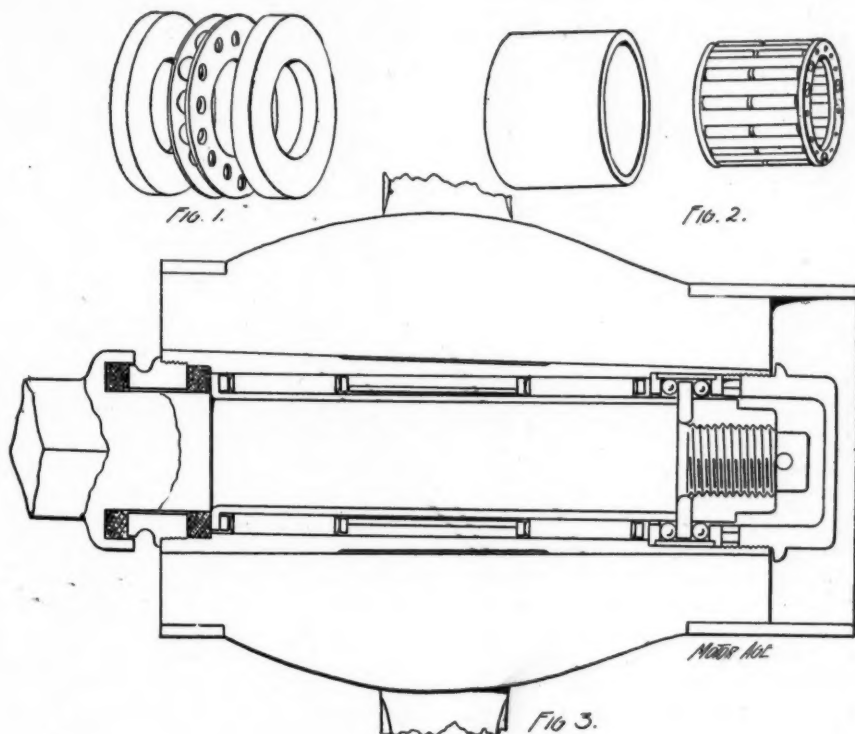
"The motor that I used is the Acme bicycle motor, manufactured by Palmer Bros., of Miamus, Conn., who supply either the complete motor or the cast-

ings. The motor may be ignited by either the wipe or jump spark, but I prefer the latter, as a more perfect regulation of speed can be obtained by its use. The motor shaft is provided with a six-toothed sprocket wheel, connected by a chain to a thirty-two-toothed sprocket wheel on the left side of the rear wheel. The other side of the rear wheel is fitted with a coaster brake, which allows the feet to remain at rest when the bicy-

THE BALL BEARING CO.

The Ball Bearing Co., of Watson Street, Boston, manufacturers, on a large scale, of anti-friction bearings, have been devoting a deal of attention to the automobile business for some time past. Some of the goods that they manufacture are shown in the accompanying illustrations.

Fig. 1 shows a thrust bearing which is of value in the axles and shafts of motor-vehicles; Fig. 2 shows a roller bear-



THE BALL BEARING COMPANY'S PRODUCT.

cle is motor-propelled, and which also provides an efficient brake.

"The whole wheel is controlled by three levers, placed on the top bar near the handlebar. Six small dry batteries making a package $3\frac{1}{2}$ by $1\frac{1}{4}$ by 7 inches and a Splitdorf jump spark coil, 4 by 4 by 8 inches, constitute the electrical part of the cycle."

Dr. Clark has applied for a patent on his attachment, but has done nothing towards marketing it, as yet, being undecided as to the best method to pursue.

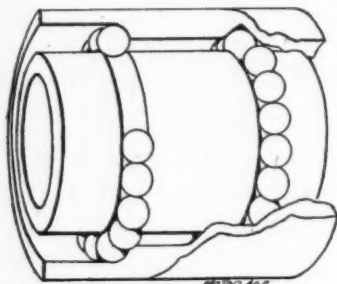
ing and sleeve, while Fig. 3 shows an axle fitted with roller bearings and ball thrust bearings of the company's make, fitted to a wood hub. In addition to the parts illustrated, the company make swivel axles and stub ends for them, various forms of ball bearings, cups, cones and balls.

In the company's elaborate catalogue is given a list of nearly fifty manufacturers of motor-vehicles who are using their products, including some of the largest concerns in the country. A very much

larger list of the most prominent firms in the United States, including the war and navy departments, is given as users of their anti-friction bearings.

A BALL BEARING

The Cleveland Block Co., 163 River Street, Cleveland, is manufacturing for a number of automobile manufacturers the ball bearing shown herewith, which is



Cleveland Block Co.'s Bearing.

intended for use in vehicles equipped with revolving axles. The bearing is made of a high quality of steel and the balls are selected and accurate. It is made with any number of rows of balls, any desired length or any diameter.

A NEW AUTOMOBILE HUB

Cleveland, Aug. 27.—Bardons & Oliver, the well known machinery and hub manufacturers, are preparing to put out a standard hub for automobiles, sulkeys and carriages which will be on a par with their well known bicycle hubs. Their goods will be turned from the solid bar and will be equipped with the best of bearings. They are also prepared to make hubs in any quantities according to specifications.

Bardons & Oliver will shortly mail a machinery catalogue which should be in the hands of every one interested in or contemplating the purchase of screw machine or turret lathes. It will be one of the most complete of its kind, affording detailed information regarding the firm's machines, as well as a vast amount of general information, tables, scales, etc., of value to machinery users. The edition

cost the firm several thousand dollars and required months to compile.

PRESSED METAL SPROCKETS

Cleveland, Aug. 27.—The Parrish & Bingham Co., famous to the bicycle trade through the production of pressed metal sprockets, has had its eye on the automobile business ever since it was first heard of, but it has been unable to cater to the wants of builders because the quantities required have been too small and the varieties too numerous. Within the past few days, however, the company has taken a contract from an eastern manufacturer for a considerable quantity of sprockets. They will be about twelve inches in diameter and with sufficient space in the center for a differential gear. The company is prepared to furnish sprockets for almost any width of chain, as its plant is equipped with machinery heavy enough to press out wheels of any reasonable diameter of sheet metal.

SUCCEEDING BICYCLE AGENCIES

Philadelphia, Aug. 27.—With but very few exceptions the local establishments devoted to the sale and repair of automobiles have been managed by men who were never identified with the cycling trade in Philadelphia. But now the better known dealers in bicycles are preparing to enter the field, and before the fall season is far advanced not a few of them will have secured the agency for one or more lines of horseless carriages and motorcycles. In the van of these cycling invaders of the auto field must be mentioned W. T. Roach, the local Stearns agent, who for the past eighteen months has done an excellent business representing the Waverley line of electromobiles. He will soon be joined by H. B. Hart, of Columbia fame, the "pioneer cycle dealer of Philadelphia," who will carry a line of motorcycles and who is incidentally experimenting with a gasoline automobile of his own design and manufacture. One of his old-time assistants, Charles Wright, is already connected with an automobile stable here (located on "Automobile Row," on North Broad

Street), and has secured the agency for a well known gasoline wagon. George W. Robb, himself an expert machinist, will, before the close of the present month, embark in the sale of motor tricycles built after designs of his own. "Bob" Garden, whose name naturally suggests the palmy days of the Victor and Crescent bicycles, will in a month or two be handling a gasoline tricycle and a steam automobile—both said to be products of the bicycle trust. Louis Hill, whose name in years ago was synonymous with Humber quality here, is also seeking an opportunity to represent an established automobile concern in this city. "Abe" Powell, for years the local handicapper; W. S. Emerson, formerly the Fowler and Trinity local representative, and a half dozen other erstwhile bicycle dealers and agents, are making preparations to enter the rapidly widening field of automobile selling and repair.

There are numerous rumors to the effect that next winter will witness a discontinuation of the cycle shows which for several years past have been a fixture here, and the substitution of a first-class automobile exposition, to continue a fortnight, and to be held in one of the large armory buildings. Although the local Cycle Board of Trade is not interested in the affair, several of those who were more or less prominent in the annual exhibitions promoted by that body seem to be the chief boomers of the proposed show.

MADISON SQUARE GARDEN SHOW

New York, Aug. 27.—All the floor space has been taken for the automobile show at Madison Square Garden, November 3-10. The demand for space has been so great that it has been decided to floor over the boxes on the north side of the Garden and also to exhibit automobiles in the restaurant.

The following manufacturers will exhibit their products:

The National Automobile & Electric Co.
Riker Motor-Vehicle Co.
Winton Motor Carriage Co.
F. A. LaRoche & Co.
De Dion-Bouton Motorette Co.
United States Automobile Co.

L. M. Harris.
The Autocar Co.
Foster Automobile Mfg. Co.
Automobile Co. of America.
Woods Motor-Vehicle Co.
Stanley Mfg. Co.
Locomobile Co. of America.
Canda Mfg. Co.
American Electric Vehicle Co.
Daimler Mfg. Co.
Waltham Mfg. Co.
American Bicycle Co.
Electric Vehicle Co.
Overman Auto. Co.
The Knox Auto. Co.
Holyoke Auto. Co.
Jos. Dixon Crucible Co.
Diamond Rubber Co.
Rose Mfg. Co.
Consolidated Rubber Tire Co.
Gleason-Peters Air Pump Co.
Goodyear Tire & Rubber Co.
Dow Portable Electric Assistant Co.
Chas. E. Miller.
Veeder Mfg. Co.
B. F. Goodrich Co.

EAGER FOR MOTORCYCLE AGENCIES

Cleveland, Aug. 27.—L. J. Sackett of the Waltham Mfg. Co., famous for Orient motorcycles as well as bicycles, was in the city Saturday and closed with Davis, Hunt & Collister, a leading retail bicycle firm, for the agency of Orient motorcycles. Mr. Sackett says the new game of selling motorcycles bears very little resemblance to the labor expended in selling bicycles these days. With the new article it is not a case of coaxing a dealer to visit the hotel and look over the line. As Mr. Sackett puts it, "Nowadays they come to the depot to meet me and very often three or four concerns in the same town have had correspondence with our office relative to handling our line, so that it is simply a case of picking out the best one. As a result we are getting our machines into the hands of some of the very best people in the country."

Among the agencies recently closed Mr. Sackett mentioned the following: Toledo, Ed. Eager & Co.; Detroit, W. H. Weber; Columbus, Oscar Lear; Dayton, William Hall; Buffalo, Finn & Sullivan; Indianapolis, C. G. Fisher; New York and Philadelphia, Wanamaker's; Cleveland, Davis, Hunt & Collister.

Mr. Sackett stated that this branch of

the business is developing at an astonishing rate and that the factory is unable to keep up with orders, and he predicts that both the three and four-wheel machines will become fully as popular in this country as they have in France.

CONSTANT IMPROVEMENTS

"To keep abreast of the times," said one of the best known automobilers in America to a Motor Age man, "one should buy a new vehicle every three months, as I am doing. The improvements are constant and radical. I sell my old vehicle a little ahead of the change, otherwise I would have it on my hands at a big loss. I believe that in the future compressed air will take the place of intermediate gearing.

MISCELLANEOUS

Advertisements under this head 5 cents per word, cash with order. Express orders, post office orders, or postage stamps accepted.

FOR SALE

FOR SALE—Winton automobile, 1899 pattern; newly renovated; looks as good as new. Address P. O. Box 548, Philadelphia, Pa. *

FOR SALE—1900 Winton Special; all latest improvements; nearly new; splendid condition. Address E. M. R., 807 N. 24th St., Philadelphia, Pa. *

FOR SALE—The Automobile Storage and Repair Co., 57 West 68th St., New York, have new and second-hand steam, gasoline, and electric carriages constantly on hand and have always some special bargains. *

STUDENT returning to College will sell latest model No. 2 "Locomobile," Bogart igniter, electric light on water glass and two wicker hampers, all in perfect order. First check for \$500 gets it. **HOUSTON GADDIS**, Dayton, Ohio.

WANTED

WANTED—First-class mechanic thoroughly familiar with the Daimler engine. Address **CHAFEUR**, care Motor Age, 150 Nassau Street, New York City.

CAN DELIVER FROM STOCK

Differential gears, transmission device, sprockets, chains, complete wheels, hubs, spokes, tires, rims, tubing, steel lugs to make running gear, castings with blue prints to make gasoline engines for 1, 1½, 2 and 4 horse-power engines, porcelain plugs, steam and air gauges.

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99 Reade Street,

New York City.

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Sent to any address in the United States, Canada or Mexico for \$2 per annum. Send for a copy of June 28 issue—25c. Complete history of the industry.

VARIABLE SPEED TRANSMISSION

For the simplest and best write . . .

EMPIRE MOTOR WORKS
990 Washington St., Buffalo, N. Y.

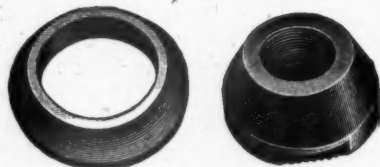
CREST MANUFACTURING CO.
— CAMBRIDGEPORT, MASS. —



CREST GASOLINE MOTORS
FOR
TRICYCLES AND AUTOMOBILES.

The **LIGHTEST** and **CHEAPEST** Motor Per Horse-Power Made in the World.

FOR MOTOR VEHICLES



GET OUR CATALOG.

THE BALL BEARING CO.
BOSTON, MASS.

ATLANTIC TUBE CO.

**WELDLESS
STEEL
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AUTOMOBILES

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AUTOMOBILE PUMPS

GLEASON PETERS AIR PUMP CO.

Mercer and Houston Sts. NEW YORK, U. S. A.

PERFECTLY NOISELESS



This omnibus is equipped with two $4\frac{1}{2}$ H. P. Motors which will stand an overload of 100 per cent. Battery capacity, 19 K. W.

We also build DELIVERY WAGONS, STANHOPES and BRAKES and guarantee them—something no other company does.

All our vehicles have *Flexible Running Gears* and *Spring Hung Motors*, are built with the least possible number of parts and have little to get out of order. Every precaution has been taken to prevent the burning out of motors or the injury of batteries from carelessness.

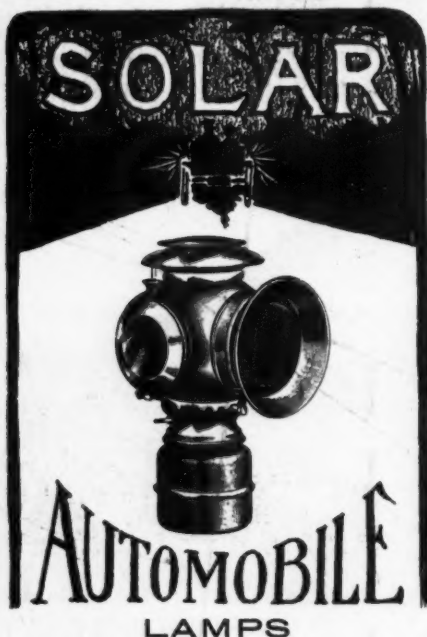
—THEY ARE AS NEAR FOOL PROOF AS POSSIBLE—

HEWITT-LINDSTROM MOTOR Co.

75 North Clinton St., CHICAGO, U. S. A.

JOHN HEWITT, President and Treasurer.

CHARLES A. LINDSTROM, Secretary and Gen'l Manager



have the same successful system of generation which has made the Solar Bicycle Lamp such a universal success. Do not experiment. Buy the old reliable. : : :

BADGER BRASS MFG. CO., Kenosha, Wis.

Automobile Patents Exploitation Company

UNDERTAKES: The manufacture of Automobiles and Motor-Cycles.

The examination of Automobile patents.

To enlist capital for the development of inventions.

FURNISHES: Specialists to make thorough examinations of patents.

Experts to test motors and automobiles.

Opportunities to inventors to present properly their propositions to concerns willing to consider and to undertake the same.

PURCHASES: All meritorious patents, licenses and inventions relating to motor-cycles, motors, gears, automobiles and their parts.

AUTOMOBILE PATENTS EXPLOITATION CO.

F. H. HYDE, SECRETARY. 27 William St., New York

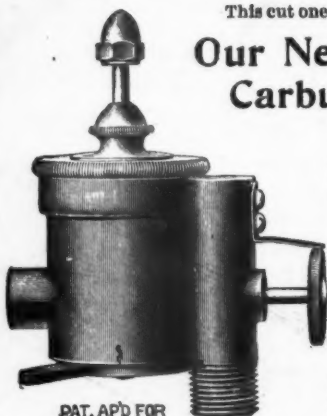
A LITTLE WONDER!

This cut one-half size of

**Our New
Carburettor**

—OR—

**Mixing
Valve**



PRICE

\$10.00

COMPACT : EASILY REGULATED : PERFECTLY SAFE

A new fitting to which special attention is drawn, is the carburettor illustrated herewith. It is compact, easily regulated and perfectly safe. At all speeds of the engine it has been demonstrated to mix the charge perfectly, a feature which assists thorough combustion and consequent absence of odor from the exhaust.

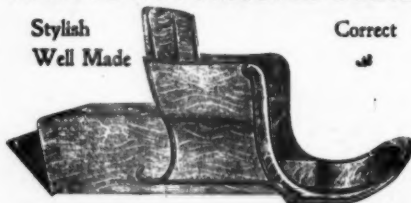
It uses very little gasoline, and does not require hot air, is operated by gravity feed and always cool. It is thought there is a great field for a compact carburettor like this and preparations are being made to take care of the demand which will follow the placing of it before users.

SMITH MOTOR CO. 54 & 56 M. & E. R. R. Av.
NEWARK, N. J.

THE FRANTZ AUTOMOBILE BODIES

Stylish
Well Made

Correct



THE FRANTZ BODY MFG. CO.
AKRON, OHIO.

Second-Hand Automobiles

Send for descriptive circular to

The St. Louis Automobile & Supply Co.
23rd and St. Charles St., ST. LOUIS, MO.

We buy and sell 2nd hand automobiles. We purchase, however, nothing but what is in good condition. Also send 10c for our 40-page illustrated catalogue of our Gasoline and Electric Vehicles, Gears, Engines, Supplies, Etc.

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NEW YORK OFFICE:
15 Platt Street

GEO. NASH & CO.

CHICAGO OFFICE:
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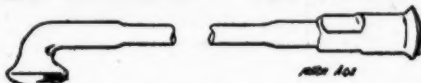
BRAZED TUBING STEERING HANDLES

Send us your blue prints for estimates.

THE KIRK MFG. CO., Toledo, Ohio

SPOKES

We manufacture Spokes for Automobiles.



EXCELSIOR NEEDLE CO., Torrington, Conn.
WESTERN OFFICE, 40 DEARBORN ST., CHICAGO

WE MANUFACTURE

SPROCKET WHEELS

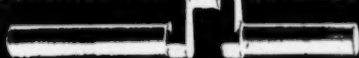
in all sizes and thickness, for any pitch chain; also miscellaneous parts for



Bicycles and Automobiles.

PETER FORG, - SOMERVILLE, MASS.

FORGINGS FOR AUTOMOBILES



SNELL CYCLE FITTINGS CO.
TOLEDO, OHIO

STEERING HANDLES FOR AUTOMOBILES.

SEND BLUE PRINTS WITH SPECIFICATIONS.

CHICAGO HANDLE BAR CO., Chicago, Ills.

For Motor Vehicles

Dixon's Pure Flake Graphite Lubricants for Engine Cylinders, Chains, Gears, Bearings, etc. Nothing can equal them.

JOSEPH DIXON CRUCIBLE COMPANY
JERSEY CITY, N. J.

We are prepared to make all kinds of
SCREW MACHINE WORK
FOR **AUTOMOBILES** AND **MOTOR BICYCLES**
REED & CURTIS MACHINE SCREW CO.
WORCESTER, MASS.

AUTOMOBILE WOOD RIMS!

28-inch to 36-inch for 2 inch to 4-inch Tires

FAIRBANKS-BOSTON RIM CO., Bradford, Pa.

C. R. WILSON CARRIAGE CO. Detroit, Michigan.
MOTOR BODIES

ACME STEEL CASTINGS

Close Grained—Strong—Suitable for Gears and Fittings.

DUCTILE STEEL
Will not harden in brazing and welding.

MALLEABLE CASTINGS
Made from refined Charcoal Iron.

ACME STEEL & MALLEABLE IRON WORKS, Buffalo, N. Y.

ENGINES, Boilers, Regulators, Burners, Gauges and Valves. Also a full line of Steam Vehicle Fittings.

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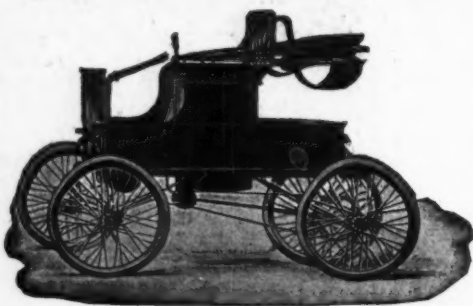
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Steam carriage to have a perfect combined condenser, muffler and feed water heater.

Steam motor to overcome all the disadvantages of the link motion for reversing, at the same time retaining all the good qualities. By our method we save 21 bearings.

Steam carriages with an indestructible water glass. We guarantee them against breakage for one year.

Steam carriage to have a perfect burner with removable tips.



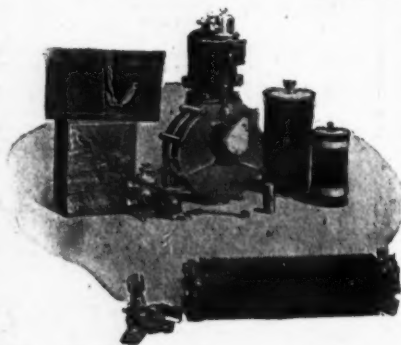
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READY**

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AUTOMOBILE
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COMPANY**

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Sole Agents and Licensed Manufacturers in U. S. of America for

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which are not in their experimental stage. Thoroughly tested in every respect. They have the highest reputation for: : : :

**Accuracy and
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Standard of the world—all others are imitations. Motors and accessories in stock for immediate shipment: : : : : : : : :

General Offices and Factory: Church Lane and 37th St., BROOKLYN, N. Y.

To reach them take 39th Street Ferry from the Battery, New York, via 39th Street car, which passes factory and offices;
 Or by Fifth Avenue Elevated from Brooklyn Bridge, via Coney Island surface cars from 36th Street, which also pass the factory and offices.

THE MOTOR AGE

The "*Locomobile*" Company of America

are now turning out in large quantities, a new and improved "*Locomobile*."

Write for circular letter describing recent improvements; also write for catalog and interesting printed matter.

—ADDRESS ALL INQUIRIES TO—



Style No. 2—\$750. F. O. B. Bridgeport, Conn.

IMMEDIATE DELIVERY Style No. 2 and Style No. 3.

THE "*Locomobile*" COMPANY OF AMERICA

11 BROADWAY, NEW YORK

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LONDON BRANCH—E. J. Halsey, 52 Sumner Pl., So. Kensington, London.



INVESTIGATE
OUR \$500
NEAT RUNABOUT
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HEAVY WORK

HERE IS THE COMING ENGINE

This engine combines advantages of water jacket and rib radiation; spark box and piston travel are water jacketed. Combustion head, in which are no valves, is ribbed.

There are many other points it will pay you to look into, as well as our Automobile Busses.

The Denison Engineering Co.

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CASTINGS

ALUMINUM
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SOFT TOUGH GREY IRON

Just the thing for Automobile
Parts. We are in position to
make prompt shipments. . .

VAN WAGONER & WILLIAMS
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CLEVELAND, OHIO

LOCOMOBILE FOR SALE

A gentleman who has purchased a Locomobile desires to dispose of the same as he expects to leave the city shortly. This vehicle is of the latest model, side steering, Victoria top and finished in dark green. It has been used only once and is in perfect condition. Cost over \$900. Will accept \$750 cash for immediate sale. Also an imported DeDion Quadricycle in splendid condition, \$400.

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F. B. HYDE

27 William St., NEW YORK.

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EDITED BY HENRY STURMEY
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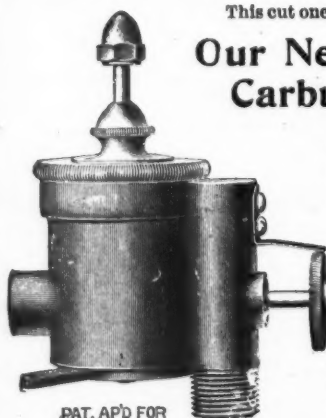
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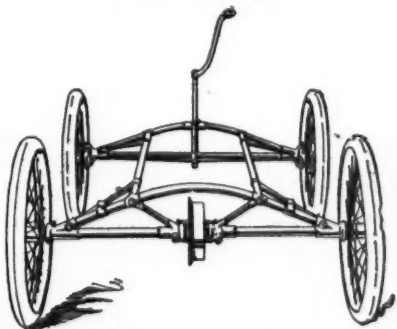
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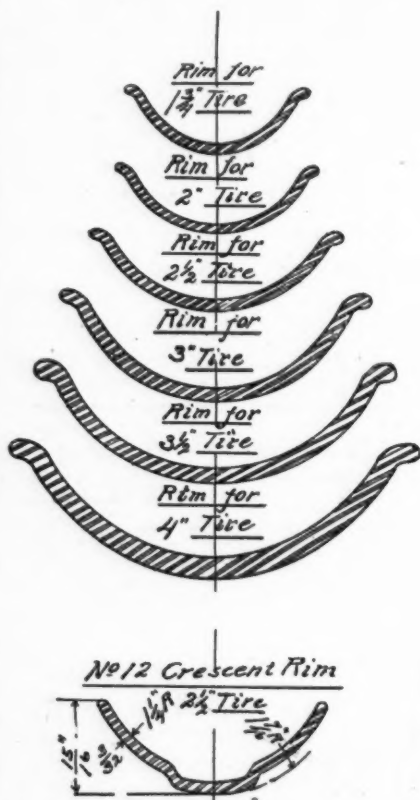
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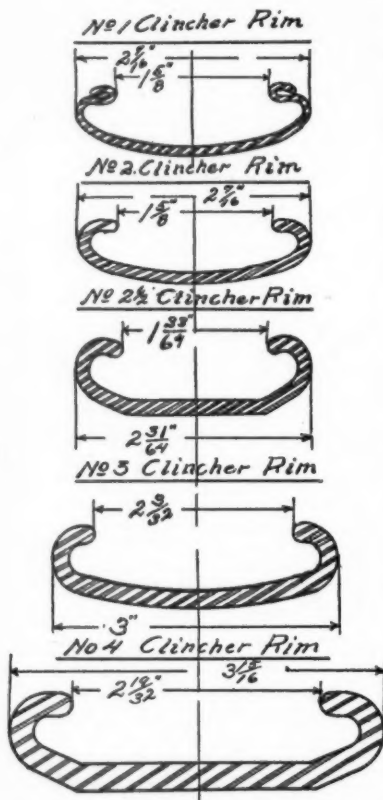
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